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MILITARY AIR POWER

The CADRE Digest of Air Power Opinions and Thoughts

Lt Col Charles M. Westenhoff, USAF

AIR POWER
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TECHNOLOGY
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MILITARY AIR POWER
The CADRE Digest of Air Power Opinions and Thoughts

Compiled by

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Foreword

This is a book of quotations and comments about air power, war, and military matters.

But it would be a great mistake to simply read the quotes and take them literally. Each selection presents a picture that you can look at again and again. Taken together, different views of the same subject matter are like a drafter's plans: they can make either an interesting multiple-view description of the subject or a puzzle.

Even a hundred books couldn't give a complete picture of air power and war. What this book attempts to do is present a mosaic—a big, grainy picture of military air power that gains value as you step back from it and achieve perspective. And like a mosaic, this picture fills in only as you fit each piece with the others.

Readers who are just embarking on a serious study of the military profession will find food for thought here; the more advanced student should find a feast. You are invited to read, reflect, enjoy, and appreciate, so you may apply your understanding when called to do so.

DENNIS M. DREW, Col, USAF
Director
Airpower Research Institute

The Challenge

Know and use all the capabilities in your airplane. If you don't, sooner or later, some guy who does use them all will kick your ass.

Dave ("Preacher") Pace, quoted in
Robert L. Shaw's *Fighter Combat*

Compare this to:

Every art has its rules and maxims. One must study them: theory facilitates practice. The lifetime of one man is not long enough to enable him to acquire perfect knowledge and experience. Theory helps to supplement it; it provides a youth with premature experience and makes him skillful also through the mistakes of others. In the profession of war the rules of the art are never violated without drawing punishment from the enemy, who is delighted to find us at fault.

Frederick the Great

Frederick was writing for infantrymen, and for national military authorities at the same time. But his principal ideas will hold for those who fly, support, and command the aerospace plane. The selections in this book compel many questions, including:

- *Is a particular lesson of war equally valid at all scales, from the individual engagement to national policy and strategy?*
- *What creates uncertainties and friction in war? How big or important are they?*
- *Are there real constants in war?*
- *What does any picture of war look like from an enemy's viewpoint? From different levels or scales?*

INTRODUCTION

Orientation

Military Air Power *contains brief statements on air power and war. Because these statements are short, their full meaning is absent. The full original texts support, qualify, and often modify these short selections.*

WARNING

The short selections that make up *Military Air Power* are not intended to represent current doctrine or policy. In fact, many were included for their irony or bombast.

A selected bibliography of books concludes this volume. Professional magazines, such as the Airpower Journal, *provide current and emerging ideas for study and growth, amplifying the continuities of war with contemporary meanings.*

Regardless of Air Force Specialty Code, we must understand the overall purposes of military air power and then see how our individual duties support those purposes.

Col Keith W. Geiger in
Airpower Journal, Fall 1987

He believed, first, that supervisors and associates must recognize the importance of each man's job or task, as well as of the man himself.

Harry R. Borowski on Gen Curtis E. LeMay's principles of leadership

On Brevity

The primary virtue of extracts is convenience; their primary hazard is oversimplifying complex things—for example, war.

As one veteran Israeli pilot said after the June 1982 air campaign over Lebanon in response to American questions about how much doctrine the Israeli Air Force had written down, "Yes, we have books. But they are very thin."

Barry D. Watts and James O. Hale in
Air University Review, 1984

WARNING

It is a good thing for an uneducated man to read books of quotations.
Sir Winston Churchill

The Checklist is not a substitute for the full text of the Flight Manual.
Stan Eval ("famous aviator")

Another problem is that short statements become slogans, which are easy to repeat and may gain a hypnotic quality.

Adherence to dogmas has destroyed more armies and cost more battles than anything in war.

J. F. C. Fuller

About Frederick the Great and Brevity

Sir Charles Napier wrote his brother from the field:

I have found Frederick of Prussia's *Instructions* very useful. I cannot tell how, except that they are practical . . . and they are in one little volume, whereas I have to hunt through your six volumes, and Napoleon's nine, which are therefore useless to me; for I cannot carry them, and would not have time to hunt out passages. . . . Jomini is too voluminous, the Archduke Charles is better, but not altogether what I want and mean; Fred is the man.

Quoted by Jay Luvaas in
Frederick the Great on the Art of War

It would further human knowledge if, instead of writing new books, we would apply ourselves to making decent extracts from those that are already in existence. Then one would hope to avoid wasting his time by reading.

Frederick the Great

CAUTION

Frederick the Great's writings fill thirty books.

NOTE: The most pertinent of Frederick's books is his *Instructions to His Generals*. Frederick is full of practical advice that echoes the ideas of Sun Tzu, Clausewitz, and twentieth-century airmen. Napier was referring to Frederick's *Instructions to His Generals* in the letter above.

Assumptions

A modern, autonomous, and thoroughly trained Air Force in being at all times will not alone be sufficient, but without it there can be no national security.

H. H. ("Hap") Arnold

Knowledge is power.

Francis Bacon

Fortune favors the prepared mind.

Louis Pasteur

Commanders and subordinates on the battlefield [need] *a set of shared assumptions that enable them to know intuitively what others might be doing* under the confused pressures of combat.

Williamson Murray

In other words, the more Air Force professionals share a common baseline of knowledge about the profession of war, and the better that baseline is, the more we can work effectively to achieve common objectives without wasted effort.

Purpose

War is not an affair of chance. A great deal of knowledge, study, and meditation is necessary to conduct it well.

Frederick the Great

No study is possible on the battlefield.

Ferdinand Foch

Many commanding generals spend their time on the day of battle in making their troops march in a straight line, in seeing that they keep their proper distances, in answering questions which their aides de camp come to ask, in sending them hither and thither, and in running about themselves. In short, they try to do everything and, as a result, do nothing. How does this happen? It is because very few men occupy themselves with the higher problems of war. They pass their lives drilling troops and [come to] believe that this is the only branch of the military art. When they arrive at the command of armies they are totally ignorant, and, in default of knowing what should be done, they do only what they know.

Maurice de Saxe

War is a matter of vital importance to the State, the province of life or death, the road to survival or ruin. It is therefore mandatory that it be thoroughly studied.

Sun Tzu

When blows are planned, whoever contrives them with the greatest appreciation of their consequences will have a great advantage.

Frederick the Great

Scope

The military student does not seek to learn from history the minutiae of method and technique. In every age these are influenced by the characteristics of weapons currently available and the means at hand for maneuvering, supplying, and controlling combat forces. But research does bring to light those fundamental principles, and their combinations and applications, which, in the past, have produced success.

Douglas MacArthur

Officers no longer look upon history as a kind of dust heap. . . . They go to it as a mine of experience where alone the gold is to be found, from which right doctrine—the soul of war—can be built up.

Julian Corbett

A wise man learns from his experience; a wiser man learns from the experience of others.

Confucius

It is right to be taught, even by an enemy.

Ovid

There is only one method of fitting our intellects to be ready for war, and that is by studying the history of air warfare, *and by no means should we neglect naval and land warfare.*

"Squadron Leader"

NOTE: "Squadron Leader" was the pen name of the author of *Basic Principles of Air Warfare*, a 1927 classic with the subtitle *The Influence of Air Power on Sea and Land Strategy*.

Selection of Materials

Read not the Times; read the Eternities.
Henry David Thoreau

As a nation we were not prepared for World War II. Yes, we won the war, but at a terrific cost in lives, human suffering, and material, and at times the margin was narrow. History alone can reveal how many turning points there were, how many times we were near losing, and how our enemies' mistakes often pulled us through. In the flush of victory, some like to forget these unpalatable truths.
"Hap" Arnold

History is not kind to nations that go to sleep. Pearl Harbor woke us up and we managed to win, although we are already forgetting the dark days when victory was uncertain, when it looked as though the scales might be tipped the other way.
George C. Kenney, 1950

While mankind's oldest histories are of wars, air power has added a significantly different element to the conduct of war in this century. The largest use of air power in war, and its most varied and complicated application, occurred in World War II. The pressure of

significant enemy successes forced air commanders to discard prewar dogma, freeing air operations from their prewar subordinate status, and forging flexible, capable air forces. World War II was fought against strong, well-led and well-equipped air forces, and it is well documented. Inevitably, this volume leans heavily on World War II sources.

Air Power

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AIR POWER

We have the enemy surrounded. We are dug in and have overwhelming numbers. But enemy airpower is mauling us badly. We will have to withdraw.

Japanese infantry commander, situation report to headquarters, Burma, World War II.

Air Power Theories

There has been a tendency to over-emphasize long-range bombardment, and to ignore the versatile application of air power. Our Air Forces were used for any mission considered important, at any given moment. Especially misleading is the distinction made between strategic and tactical air forces. That distinction is not valid in describing the use of air power as a whole, day after day.

For instance, the primary mission of the strategic air forces was to destroy the enemy's war industries, to deprive him of means to fight. But these same bombers, and their fighter escorts of the strategic air forces, constituted the heaviest striking power at General Eisenhower's command to sweep the Luftwaffe from the air, to isolate German ground forces from reinforcements and

supplies, and to spark the advance of our ground troops by visual and radar cooperation.

Carl ("Tooey") Spaatz

General Spaatz had a "complete" view of air power, free of artificial constraints, mandatory prescriptions, or absolutes. All useful ideas from the many theorists of the differing schools contribute to a pragmatic, unfettered, and "complete" view or theory of air power.

If we should have to fight, we should be prepared to do so from the neck up instead of from the neck down.

Jimmy Doolittle

Air power is indivisible. If you split it up into compartments, you merely pull it to pieces and destroy its greatest asset—its flexibility.

Field Marshal Bernard Montgomery

Air power is the ability to do something in the air.

Billy Mitchell

Air power is like poker. A second-best hand is like none at all—it will cost you dough and win you nothing.

George Kenney

Air power alone does not guarantee America's security, but I believe it best exploits the nation's greatest asset—our technical skill.

Hoyt S. Vandenberg

It may be said that Douhet was the theorist of air power, Mitchell the publicist and catalytic agent, and Trenchard the organizational genius.

Harry H. Ransom

The Nature of Air Power

Once the command of the air is obtained by one of the contending armies, the war must become a conflict between a seeing host and one that is blind.

H. G. Wells

In the air all directions lead everywhere.

H. G. Wells

Neither the Army nor the Navy is of any protection, or of very little protection, against aerial raids.

Alexander Graham Bell

The first important difference between air forces and armies is that, within his tactical range, the airman is independent of lines of communication and has no flanks. The only other important difference between armies and air forces is that an air force is not committed to any one course of action.

J. C. Slessor

Because of its independence of surface limitations and its superior speed the airplane is the offensive weapon par excellence.

Giulio Douhet

The measure of airpower is the ability of a nation to exploit airspace for its own purposes—and in wartime to deny it to an enemy.

Adm Arthur Radford

Assumptions regarding basic features of war in the medium of air space are: the primacy of air superiority; the unity of air power; criteria for the selection of targets for attack; the factors of range, base vulnerability, and selection of firepower; the crucial relationship between offense and defense; and air forces as a deterrent to enemy initiative.

Eugene M. Emme

Air power can either paralyze the enemy's military action or compel him to devote to the defense of his bases and communications a share of his straitened resources far greater than what we need in the attack.

Winston Churchill

Aerial forces menace all the territory comprised in their radius of action. They can set off from different points and arrive "en masse" on a chosen point. They lend themselves to the offensive because

they leave the adversary, until the last moment, in uncertainty as to their objective.

A. Vauthier, paraphrase of Douhet

The air ocean and its endless outer space extension are one and indivisible, and should be controlled by a single homogeneous force.

Alexander P. de Seversky

The very flexibility of air forces makes true cooperation essential. Air forces, at short notice, can be switched from one sort of target to another and, within limits, from one type of operation to a quite different type. There is, therefore, a constant temptation to use them piecemeal to meet an immediate requirement, rather than to use them on a long-term joint plan, and to utilize their flexibility in the method of achieving a consistent aim which is an integral part of our government's policy and of our strategy to implement that policy.

J. C. Slessor

Every soldier generally thinks only as far as the radius of action of his branch of the service and only as quickly as he can move with his weapons.

Luftwaffe Gen Karl Koller

If we lose the war in the air we lose the war and lose it quickly.

Field Marshal Montgomery

Elements of Air Power

Air power is the total aviation activity—civilian and military, commercial and private, potential as well as existing.

"Hap" Arnold

The air power of a nation is what it actually has today. That which it has on the drafting board cannot become its air power until five years from now.

Frank M. Andrews

I have flown in just about everything, with all kinds of pilots in all parts of the world—British, French, Pakistani, Iranian, Japanese, Chinese—and there wasn't a dime's worth of difference between any of them except for one unchanging, certain fact: the best, most skillful pilot had the most experience.

Charles E. ("Chuck") Yeager

Why can't they buy just one airplane and take turns flying it?

Calvin Coolidge

Air power is a complex of at least fifteen different elements, each of which must be considered indispensable. The relative importance of each must be variable, yet the absence of any one must endanger control of the air or prevent its exploitation. . . . The fifteen elements are:

Raw materials and fuel
Industrial potential, tool reserves, and high rate of technological progress
Bases and protective forces
Communications and Electronics
Logistics and supplies
Auxiliary services
Airborne forces
Guided missiles and atomic weapons
Aircraft
Manpower
Training
Morale
Intelligence
Research and Inventiveness
Tactics – Strategy – Planning

Stefan T. Possony

"Complete" Uses of Air Power

While many air power theorists concentrated on specific applications of aircraft to war, the weight of history appears to emphasize air power's flexible application as much as the successes of individual missions.

[World War II] showed beyond all cavil that airpower, especially when applied as widely and in as many directions as the United States could [apply it], dominated surface warfare.

David MacIsaac

There was no line of cleavage between strategic and tactical air forces. It was over-all effort, uniting all types of aircraft, coordinated for maximum impact.

"Tooey" Spaatz

The four principles of air power that I set out were:

1. To obtain mastery of the air, and to keep it, which means continually fighting for it.

2. To destroy the enemy's means of production and his communications by strategic bombing.

3. To maintain the battle without any interference by the enemy.

4. To prevent the enemy being able to maintain the battle.

Air Marshal Hugh Trenchard

Once real mastery of the air was obtained, all sorts of enterprises would become easy. All kinds of aeroplanes could come into play.

Winston Churchill

Air power had a mighty vindication in World War II. But it was Mitchell's conception of it—anything that flies—rather than Douhet's that was vindicated.

Bernard Brodie

The single clear lesson of World War II was that the visionaries were correct that all future warfare would be dominated from the air. They agreed on that. What they argued about was just *how* airpower would dominate surface warfare.

David MacIsaac

It was not appreciated, and has scarcely been appreciated today, that the fighting power of an army is *the product* and *not the sum* of the arms composing it.

J. F. C. Fuller

A nation may have every other element of air power but still lag behind if its government has no real urge to insure its future development. The attitude and actions of government will fully determine the size of our military air establishment, and greatly affect the efficiency of our civil air establishment, our aeronautical industry and facilities—hence our air power in being.

John C. Cooper

GENERAL ARNOLD'S FUNDAMENTAL PRINCIPLES OF AIR POWER

Throughout the war, I tried to have the Air Force operate under certain fundamental principles:

1. The main job of the Air Force is bombardment: large formations of bombardment planes must hit the enemy before the enemy hits us. In short, the best defense is attack.
2. Our planes must be able to function under all climatic conditions from the North Pole to the South Pole.
3. Daylight operations, including daylight bombing, are essential to success, for it is the only way to get precision bombing. We must operate with a precision bombsight—and by daylight—realizing full well that we will have to come to a decisive combat with the enemy Air Force.
4. We must have highly developed, highly trained crews working together as a team—on the ground for maintenance and in the air for combat.

Source: Extracted from General Arnold's *Global Mission*, 290–91.

5. In order to bring the war home to Germany and Japan, and deprive them of the things that are essential for their war operations, we must carry our strategic precision bombing to key targets, deep in the enemy territory, such as airplane factories, oil refineries, steel mills, aluminum plants, submarine pens, Navy yards, etc.

6. In addition to our strategic bombing, we must carry out tactical operations in cooperation with ground troops. For that purpose we must have fighters, dive bombers, and light bombers for attacking enemy airfields, communications centers, motor convoys, and troops.

7. All types of bombing operations must be protected by fighter airplanes. This was proved to be essential in the Battle of Britain, and prior to that our own exercises with bombers and fighters indicated that bombers alone could not elude modern pursuit, no matter how fast the bombers traveled.

8. Our Air Force must be ready for combined operations with ground forces, and with the Navy.

9. We must maintain our research and development programs in order to have the latest equipment it was possible to get, as soon as it was possible to get it.

10. Air power is not made up of airplanes alone. Air power is a composite of airplanes, air crews, maintenance crews, air bases, air supply, and sufficient replacements in both planes and crews to maintain a constant fighting strength, regardless of what losses may be inflicted by the enemy. In addition to that, we must have the backing of a large aircraft industry in the United States to provide all kinds of equipment, and a large training establishment that can furnish the personnel when called upon.

Objectives of Air Power Employment

The early theorists explored the ways in which air power could contribute to or decide the outcome of war. The various theories focused on political, economic, and psychological objectives, on theater maneuver, and on neutralizing opposing air and surface forces.

Objectives vary considerably in war, and the choice of them depends chiefly upon the aim sought, whether the command of the air, paralyzing the enemy's army and navy, or shattering the morale of civilians behind the lines. This choice may therefore be guided by a great many considerations—military, political, social, and psychological.

Douhet

Economic and Political Objectives

Differences between air power theories reveal cultural differences. For example, a writer concerned with defending the nation from air attack will tend to understand the country's vulnerabilities and expect the same vulnerabilities to apply in another nation even though different cultures may not share the same priorities.

The Strategic Theory postulates that air attack on internal enemy vitals can so deplete specific industrial and economic resources, and on occasion the will to resist, as to make a continued resistance by the enemy impossible.

To accomplish the strategic purpose, it is necessary to destroy only a small portion of industry, probably not more than a fraction of the total required to conduct modern warfare on a large scale.

It is conceivable that there will always be one industry, such as the oil industry in Germany, so necessary to all phases of the national war-making ability that its destruction would be fatal to the nation.

"Hap" Arnold

[In World War I] air raids on both sides caused interruptions to production and transportation out of all proportion to the weight of bombs dropped.

Edward Meade Earle

The flexibility which the range of aircraft gives to air forces permits concentrated effort against a particular target system or complex without need for concentration against a particular target of the system; hence the enemy is unable to keep his defenses in one geographical area.

Air University Manual 1, 1951

A modern state is such a complex and interdependent fabric that it offers a target highly sensitive to a sudden and overwhelming blow from the air.

B. H. Liddell Hart

Target systems for air attack may be broadly divided into two classes: point targets and common denominators.

1. Key points are vulnerable parts of the industrial or military structure, the destruction of which might wreck the whole.

2. Common denominator targets . . . railways, canals, power plants, iron and steel plants, oil: probably dispersed geographically, but destruction of which would collectively affect the whole war effort.

Air Chief Marshal Sir Arthur Tedder

Strategic air assault is wasted if it is dissipated piecemeal in sporadic attacks between which the enemy has an opportunity to readjust defenses or recuperate.

"Hap" Arnold

The advocates of all-out air-power maintain that area destruction and mass annihilation can effectively destroy the war potential of the adversary and lower his strength and will to continue the struggle. It should be remembered, however, that the objective of war is the exercise of effective control over the political elite of the state to enforce a political decision.

S. T. Das

Psychological Effects

Air power has had enormous psychological impact on the battlefield and has been particularly influential when first introduced. In a war that is primarily psychological, air power objectives can be selected for maximum impact on a particular group of people.

Air power is, above all, a psychological weapon—and only short-sighted soldiers, too battle-minded, underrate the importance of psychological factors in war.

Liddell Hart

As there was no defence, the two airships hovered low over the city, and one could see the gleam of light each time a trapdoor opened to drop a bomb. The moral effect of that undisturbed attack was so great that every time the sirens sounded, in the weeks that followed, thousands of the population streamed out into the surrounding countryside.

Personal account of a Zeppelin raid by Liddell Hart

Every reliable report from those capitals tells of the mounting fear that seized upon the population: the fear of being bombed from the air. The fear of the

unknown is ever more potent than the fear of a known thing which may be weighed and measured and resolutely faced.

George Fielding Eliot

It is not so much the existence of a military establishment that determines a people's will to resist as it is their confidence in it, as witness the collapse of Japan while still armed with effective ground forces numbering over three million. In other words, the will of a nation to resist is not always dependent on armed strength, but rather upon its *belief* in its chances for political success.

Dale O. Smith

Loss of hope, rather than loss of life, is the factor that really decides wars, battles, and even the smallest combats. The all-time experience of warfare shows that when men reach the point where they see, or feel, that further effort and sacrifice can do no more than delay the end, they commonly lose the will to spin it out and bow to the inevitable.

Liddell Hart

It is improbable that any terrorization of the civil population which could be achieved by air attack would compel the Government of a great nation to surrender. In our own case, we have seen the combative spirit of the people roused, and not quelled, by the German air raids. Therefore, our air offensive should consistently be directed at striking

the bases and communications upon whose structure the fighting power of his armies and fleets of the sea and air depends.

Winston Churchill, 1917

[During the Spanish Civil War] both the Fascists and Republicans were fighting for control of the country and, as a result, the destruction of cities and production facilities by either belligerent would have produced for the attacker an immediate advantage and a subsequent liability in the event of victory directly proportional to the success of the attack.

"Tooey" Spaatz

Control of the Air

Without a reasonable degree of air superiority, no air force can effectively assist land or sea forces or strike at the enemy's war potential.

Lord Tedder

The major thesis held by Trenchard and Mitchell, as well as Seversky, was that command of the air is of first priority to any military success in war.

Dale O. Smith

Air control can be established by superiority in numbers, by better employment, by better equipment, or by a combination of these factors.

"Tooey" Spaatz

After all, the great defence against aerial menace is to attack the enemy's aircraft as near as possible to their point of departure.

Winston Churchill, memo of 5 September 1914, proposing a combined offensive and defensive counterair campaign

After Big Week, Spaatz, who commanded the United States strategic air forces, sensed that air

superiority had been wrenched from the enemy. In the space of six days, massive and deep penetrations had been made to fifteen large industrial areas by some six thousand bombers. Allied losses were far less than had been expected, amounting to about six per cent for the six day battle. As a consequence, Allied morale soared while enemy morale plummeted.

Dale O. Smith

The first and absolute requirement of strategic air power in this war was control of the air in order to carry out sustained operations without prohibitive losses.

"Tooey" Spaatz

One general inference to be drawn has been that in twentieth-century war, defeat will almost always be avoided (and outright victory likely gained) by the side that has secured air superiority. Indeed, a more comprehensive perusal would probably show that virtually the only exceptions concern counterinsurgency warfare.

Neville Brown

The future battle on the ground will be preceded by battle in the air. This will determine which of the contestants has to suffer operational and tactical disadvantages and be forced throughout the battle into adopting compromise solutions.

German Gen Erwin Rommel

To use a fighter as a fighter-bomber when the strength of the fighter arm is inadequate to achieve air superiority is putting the cart before the horse.

Adolf Galland

Air Power and Maneuver

The primary objective of Allied forces in the Southwest Pacific is to advance our own network of air bases deep into the Japanese perimeter.

"Hap" Arnold

Movement is the essence of strategy. This is true even though strategy is not confined to the military art: the implementation of every political decision requires movement. It may be messages that move, or men, or money, or munitions.

Stephen B. Jones

Air strategy begins with airplane ranges. Airplane ranges determine the location of bases. The proximity to the target of the bases under one's control fixes the weight and rhythm of the attack.

"Tooey" Spaatz

The Americans, with minimum losses, attacked and seized a relatively weak area, constructed airfields, and then proceeded to cut the supply lines to troops in that area. The Japanese Army preferred direct assault, after German fashion, but the Americans flowed into our weaker points and submerged us, just as water seeks the weakest

entry to sink a ship. We respected this type of strategy for its brilliance because it gained the most while losing the least.

Lt Col Matsuichi Iino,
Japanese Eighth Area Army

Strange as it may seem, the Air Force, except in the air, is the least mobile of all the Services. A squadron can reach its destination in a few hours, but its establishment, depots, fuel, spare parts, and workshops take many weeks, and even months, to develop.

Winston Churchill

When the United States forces first landed in North Africa, there were nine airdromes that our planes could use. Within a few months there were a hundred. Mud, and later dust, were the worst problems. With the Axis on the run, airfields were built even faster. One request was received to build several airfields in the Sbeitla sector; seventy-two hours later, all were in use.

"Hap" Arnold

I had ocular proof of the advantage to be derived from such observations. . . . An observer is doubtless more at his ease in a clock-tower than in a frail basket floating in mid-air, but steeples are not always at hand in the vicinity of battlefields and they can not be transported at pleasure.

Henri Jomini

LORD TEDDER'S PRINCIPLES OF AIR WARFARE

In June 1942 after the British victory at El Alamein, Air Marshal Lord Tedder enunciated ten inviolable rules of air power. These principles became the foundation upon which Allied tactical air doctrine would evolve at the Casablanca Conference in January 1943. These ten principles were:

1. Air power must be independent of land and sea forces.
2. The Army Headquarters in the field and the Air Headquarters must be adjacent to each other. This close proximity will facilitate communication and cooperation between the two services.
3. Every night the air and ground commanders must hold a joint staff meeting to hash over problems and decide tomorrow's program. The close air support and air interdiction campaigns can then be integrated into the ground commander's overall concept of operations.
4. Radar is very important to air and land forces. It should be located on airfields so that fighters will not be caught on the ground and destroyed by a surprise enemy attack.
5. The fighter plane is the basic weapon of an air force. It should be used for the following missions in this priority:

a. Fighter sweeps to clear the enemy out of the sky.

b. Escort for light and medium bombers.

c. Interception of enemy aircraft.

d. As a fighter bomber to provide CAS for ground forces.

6. Always assure quick communications between the Air Headquarters and the Unit Commander. Air power is based on being at the right spot at the proper time to destroy the enemy air and land forces. Quick communications are essential to this flexible response by aircraft.

7. The entire air force should be commanded from an Advanced Headquarters located close to the front lines.

8. Air power must have a simplified chain of command. Commanders should restrict the number of people who report to them. These men should be directly responsible for air operations. During the North African campaigns, Lord Tedder had only six men report directly to him. This way his mind was not bothered by trivial matters. These responsibilities he delegated to his key staff members.

9. Intelligence is very important to an air or ground campaign. He had to have the information coming in constantly, right where he could see it. His Intelligence and Operations officers sat at adjoining desks and shared phone lines to the units. Since the A-2 and A-3 sat side by side, Lord Tedder could walk in and get any information he wanted, right on the spot.

10. Mobility is the key to successful air operations. He believed units should be broken down, even to the squadron level, in a 50/50 ratio—each divided into two parts, with each part self-maintaining in all departments. If independent operations were needed, he employed a leap frog technique. The first element would deploy to the front; when the next deployment occurred the second unit would leap frog past the first unit to the front lines. The most forward element would then become the command element to control the battle. He also believed that units should be able to move within four hours and should deploy to support its operations in isolation for three to four days.

These principles were incorporated into the training and doctrine of each Ninth Air Force unit by Generals Brereton and Quesada. The British Army and Royal Air Force also incorporated these ideas into their doctrine after El Alamein in 1942. Much of the Allied tactical air force success sprang from Lord Tedder's ten crucial air power principles.

Interdiction and Attrition

Air power has consistently demonstrated its advantages in attacking surface forces at a time and place of choice. This has permitted disruption, attrition, exhaustion, defeat in detail, demoralization, and occasionally annihilation. Equally important, air power has created conditions that helped cooperating surface forces to fight better, magnifying the payoff for the operational investment, so to speak.

To have command of the air means to be able to cut an enemy's army and navy off from their bases of operation and nullify their chances of winning the war.

Douhet

It is infrequently claimed that the maintenance of a favorable situation in the air is the *principal* task of both bombers and fighters in the field. This is definitely not so. Air superiority is only a means to an end. The object of air superiority is the control of air communications, *firstly for our own use* and secondly to deny it to the enemy. And the use we require is to "conduct operations against an enemy"; and this, in a land campaign, means to *break down* the resistance of the enemy army.

J. C. Slessor

The greatest secret of war and the masterpiece of a skillful general is to starve his enemy.

Frederick the Great

The idea that superior air power can in some way be a substitute for hard slogging and professional skill on the ground is beguiling but illusory. Air support can be of immense value to an army; it may sometimes be its salvation. But armies can fight—and not only defensively—in the face of almost total air superiority.

J. C. Slessor

For our air offensive to attain its full effect, it is necessary that our ground offensive should be of a character to throw the greatest possible strain upon the enemy's communications.

Winston Churchill, 1917

Air interdiction and ground maneuver must be synchronized so that each complements and reinforces the other. Synchronization is important because it can create a dilemma for the enemy that has *no* satisfactory answer. His dilemma is this: if he attempts to counter ground maneuver by moving rapidly, he exposes himself to unacceptable losses from air interdiction; yet if he employs measures that are effective at reducing losses caused by air interdiction, he then cannot maneuver fast enough to counter the ground component of the campaign.

Price T. Bingham

If the enemy has air supremacy and makes full use of it, then one's own command is forced to suffer the following limitations and disadvantages:

By using his strategic air force, the enemy can strangle one's supplies, especially if they have to be carried across the sea.

The enemy can wage the battle of attrition from the air.

Intensive exploitation by the enemy of his air superiority gives rise to far-reaching tactical limitations for one's own command.

Erwin Rommel

The argument has been advanced that the Air Force should be concerned with land objectives, and the Navy with objectives on and over the water. That distinction is to deny the peculiar quality of the air medium, the third dimension. The air is indivisible; it covers land and sea.

"Tooey" Spaatz

Control of the air was essential to every major military operation. Control of the air allowed surface vessels to sail the seas as far as that control extended, even within range of enemy land-based airplanes. Control of the air permitted amphibious landings at any point where that control could be assured. Control of the air permitted close air support to ground forces, the effectiveness of which was decisive wherever fully employed. Control of the air over lines of communications [blocked enemy interdiction of them] and preserved them to ourselves. Control of the air over the Japanese home islands permitted the

destruction by long-range bombers of such of her industries and cities as we chose to attack. *The first objective of all commanders in the Pacific war, whether ground, sea or air, whether American, Allied or Japanese, was to assure control of the air.*

Orvil A. Anderson

Airpower has become predominant, both as a deterrent to war, and—in the eventuality of war—as the devastating force to destroy an enemy's potential and fatally undermine his will to wage war.

Omar Bradley

Persistence

The guiding principle of bombing actions should be this: the objective must be destroyed completely in one attack, making further attack on the same target unnecessary.

Douhet

Douhet expressed an ideal that has rarely been possible.

Air battle is not decided in a few great clashes but over a long period of time when attrition and discouragement eventually cause one side to avoid the invading air force.

Dale O. Smith

This process of imposing your will on an enemy, of reducing his ability to resist to the breaking point, is rarely—in any war against a determined foe—a quick or simple one. Against a tough foe, only the sustained application of military forces, not sporadic and intermittent attack, is effective.

Hanson Baldwin

Air Power Prophecy: Its Hazards

In order to assure an adequate national defense, it is necessary—*and sufficient*—to be in a position in case of war to conquer the command of the air.

Douhet

The bomber will always get through.

Stanley Baldwin

Engines of war have long since reached their limits, and I see no further hope of any improvement in the art.

Frontinus, 90 A.D.

Few people who know the work of Langley, Lilienthal, Pilcher, Maxim and Chanute but will be inclined to believe that long before the year 2000 A.D., and very probably before 1950, a successful aeroplane will have soared and come home safe and sound.

H. G. Wells, 1901

War

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The Nature of War

We can get to know war in the same way we can get to know the surface of the earth: if war is considered as a huge expanse of terrain, we can see only small pieces of the terrain through personal experience. Great military thinkers who spent their lives studying war only provide us maps of the terrain they covered. Detailed maps of specific features—for example, air combat—cover only portions of the terrain. The broad maps of writers such as Sun Tzu can only show us war's big features. It's important, then, to keep in mind that we can study others' maps, but the terrain of war defies perfect representation.

Five great enemies to peace inhabit with us—avarice, ambition, envy, anger, and pride. If those enemies were to be banished, we should infallibly enjoy perpetual peace.

Petrarch

CAUTION

It is apparently not possible for another real war among the nations of Europe to take place.

David Starr Jordan, 1914

We live in a world where emergencies are always possible, and our survival may depend on our capacity to meet emergencies. Having said that, it is necessary also to say that emergency measures—however good for the emergency—do not make good permanent policies. Emergency measures are costly, they are superficial, and they imply that the enemy has the initiative.

John Foster Dulles

Soldiers usually are close students of tactics, but rarely are they students of strategy and practically never of war.

Bernard Brodie

War is part of the intercourse of the human race.
War is the province of danger, and therefore courage above all things is the first quality of the warrior.
War is the province of physical exertion and suffering.
War is the province of uncertainty.
War is the province of friction.
War demands resolution, firmness, and staunchness.

Chapter titles to Ernest Hemingway's *Men at War*, quoting Clausewitz

Clausewitz on Policy and War

Now the first, the grandest, and most decisive act of judgment which the Statesman and General exercises is rightly to understand in this respect the war in which he engages, not to take it for something, or wish to make of it something, which by the nature of its relations it is impossible for it to be.

The ultimate object of our wars, the political one, is not always quite a simple one.

The great point is to keep the overruling relations of both parties in view. Out of them a certain center of gravity, a center of power and movement, will form itself, on which all depends.

Truth alone is but a weak motive of action with men, and hence there is always a great difference between knowing and action, between science and art.

Where no powerful motives press and drive, cabinets will not risk much in the game. The more war becomes in this manner devitalized so much the more its theory becomes destitute of the necessary firm pivots and buttresses for reasoning.

Where judgment begins, there art begins.

Clausewitz

War as Art and Science

The terrain of war is generally mapped using one of two "projections": those of art and science. As with other maps, detailed study of both projections leads to more complete understanding of the terrain.

The science of war (knowledge).

The art of war (application of knowledge).

Wallace P. Franz and Harry G. Summers, notes in Army War College, *Art of War Colloquium Text*

It is absolutely true in war, were other things equal, that numbers—whether men, shells, bombs, etc.—would be supreme. Yet it is also absolutely true that other things are never equal and can never be equal. There is always a difference, and it is the differences which by begging to differ so frequently throw all calculations to the winds.

J. F. C. Fuller

War belongs not to the province of Arts and Sciences, but to the province of social life. It is a conflict of great interests, which is settled by bloodshed, and only in that is it different from others. It would be better, instead of comparing it with any Art, to liken it to business competition, which is also a conflict of human interests and

activities; and it is still more like State policy, which, again, can be looked upon as a kind of business competition on a great scale.

Clausewitz

All the numerous applications of physics, chemistry, engineering, etc., which make up the modern arsenal are in fact at the mercy of humans, the soldiers who use or direct them.

S. T. Das

War involves in its progress such a train of unforeseen and unsupposed circumstances that no human wisdom can calculate the end. It has but one thing certain, and that is to increase taxes.

Thomas Paine

War and truth have a fundamental incompatibility. The devotion to secrecy in the interests of the military machine largely explains why, throughout history, its operations commonly appear in retrospect the most uncertain and least efficient of human activities.

Liddell Hart

If I always appear prepared, it is because before entering on an undertaking, I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I should do in circumstances unexpected by others; it is thought and preparation.

Napoléon

There is no other science where judgments are tested in blood and answered in the servitude of the defeated, where the acknowledged authority is the leader who has won or who instills confidence that he can win.

Bernard Brodie

War, like most things, is a science to be acquired and perfected by diligence, by perseverance, by time, and by practice.

Alexander Hamilton

In war, situations are the products of mutually exclusive and incompatible wills. Thus, they are practically always fluid.

S. B. Griffith

Time and Space

Time is necessary to both belligerents, . . . the only question is: which of the two, judging by his position, has most reason to expect *special advantages* from time?

Clausewitz

When you engage in actual fighting, if victory is long in coming, the men's weapons will grow dull and their ardour dampened. Again, if the campaign is protracted the resources of the State will not be equal to the strain. Thus, though we have heard of stupid haste in war, cleverness has never been associated with long delays. There is no instance of a country having benefitted from prolonged warfare.

Sun Tzu

Time is the condition to be won to defeat the enemy. Time ranks first among the three factors necessary for victory, coming before terrain and support of the people. Only with time can we defeat the enemy.

Ho Chi Minh

Space in which to maneuver in the air, unlike fighting on land or sea, is practically unlimited.

J. E. ("Johnnie") Johnson

At the outset of a war, time is the supreme factor. Do not let us forget that the aggressor is also concerned with the time factor: he is ready, otherwise he would not have provoked armed conflict; he inevitably hopes and plans for a quick decision, since no one would wish for a long war if it could be avoided; moreover he wants a decision before his opponent has had time to "turn his capacity into the new activities which war calls for."

Lord Tedder

Go sir, gallop, and don't forget that the world was made in six days. You can ask me for anything you like, except time.

Napoléon

A good plan executed *now* is better than a perfect plan next week.

George S. Patton

In peace time, differences of opinion may be allowed to go by the board without great harm being done. . . . In war the case is different—chickens remorselessly and rapidly come home to roost, errors can seldom be rectified (the enemy will see to that) and men's lives are at stake.

Field Marshal Sir William Robertson

Rapidity is the essence of war.

Sun Tzu

The last war is not modern, it is out of date.

At the same time there are factors that do not change, or only change very slowly. Geography does not change—though its effect on military operations may be modified by technical changes. Human nature does not change, and national characteristics and temperaments change but slowly. Economic factors, generally speaking, change slowly.

Lord Tedder

But there is one element in relation to the flying machine that we are not producing, that we cannot produce in an emergency, and that is the men. We can produce machines but not the aviators. That takes time.

Alexander Graham Bell

Strategy is the art of making use of time and space. Space we can recover; lost time, never.

Napoléon

He who can move twice as fast as his opponent doubles his operative time and thereby halves that of his opponent.

J. F. C. Fuller

Time was his constant ally; he capitalized every moment, never pondered on it, and thereby achieved his ends before others had settled on their means.

J. F. C. Fuller describing
Alexander the Great

Strategy

The complexities of war continue to increase with technical developments. At the broadest levels of military thought, "ideal" solutions to military problems are constrained by the realities of political checks and balances, alliances, popular thought and feeling, and competing demands for resources. Detailed study of strategy—plans and alternatives—creates the ability to perceive opportunities where others see only problems.

Strategy is the employment of battle to gain the end in war; it must therefore give an aim to the whole military action, which must be in accordance with the object of the war; in other words, strategy forms the plan of the war.

Clausewitz

Tactics are concerned with doing the job "right," higher levels of strategy are concerned with doing the "right" job.

Dennis M. Drew and Donald M. Snow

While the horizon of strategy is bounded by war, grand strategy looks beyond the war to the subsequent peace.

Liddell Hart

Throughout his life Alexander consistently subordinated strategy to policy, which is the essence of grand strategy.

J. F. C. Fuller

The strategist is he who always keeps the objective of the war in sight and the objective of the war is never military and is always political.

Alfred Thayer Mahan

The twin problems of modern warfare:

How to persuade the adversary to come to terms without inflicting on him such severe damage as to prejudice all chances of subsequent stability and peace?

Under what circumstances can armed force be used, in the only way in which it can be legitimate to use it, to ensure a lasting and stable peace?

Michael Howard

The soundest strategy is to postpone operations until the moral disintegration of the enemy renders the delivery of the mortal blow both possible and easy.

Vladimir I. Lenin

True economy of force is using the indirect approach to effect a psychological defeat without engaging in actual combat.

Liddell Hart

In war the victorious strategist seeks battle after the victory has been won, whereas he who is destined to defeat first fights and afterwards looks to victory.

Sun Tzu

We must perceive the necessity of every war being looked upon as a whole from the very outset, and that at the very first step forward the commander should have the end in view to which every line must converge.

Clausewitz

In Japan there was nothing that could be called grand or military strategy until a short time before the outbreak of World War II. There was little correlation between her national defense theory and the strategic plans of the army and the navy. In [my opinion this] eventually resulted in the calamity of Japan entering into her disastrous war.

Japanese historian Toshiyuki Yokoi;
it deserves mention that Japan's army and naval strategies were not well coordinated.

Generally in war the best policy is to take a state intact; to ruin it is inferior to this. To capture the enemy's army is better than to destroy it. To subdue the enemy without fighting is the acme of skill. Thus, what is of extreme importance in war is to attack the enemy's strategy; next best is to disrupt his alliances; next best is to attack his forces. The worst policy is to attack his cities; do so only when there is no alternative.

Sun Tzu

Where the strategist is empowered to seek a military decision, his responsibility is to seek it under the most advantageous circumstances in order to produce the most profitable result. *Hence his true aim is not so much to seek battle as to seek a strategic situation so advantageous that if it does not of itself produce the decision, its continuation by battle is sure to achieve this.*

Liddell Hart

(1) He will win who knows when to fight and when not to fight.

(2) He will win who knows how to handle both superior and inferior forces.

(3) He will win whose army is animated by the same spirit throughout all the ranks.

(4) He will win who, prepared himself, waits to take the enemy unprepared.

(5) He will win who has military capacity and is not interfered with by the sovereign.

Victory lies in the knowledge of these five points.

Sun Tzu

Deterrence

To be prepared for war is one of the most effectual means of preserving peace.

George Washington

The expenses required to prevent a war are much lighter than those that will, if not prevented, be absolutely necessary to maintain it.

Benjamin Franklin

It is customary in democratic countries to deplore expenditure on armament as conflicting with the requirements of the social services. There is a tendency to forget that the most important social service that a government can do for its people is to keep them alive and free.

J. C. Slessor

If a nation values anything more than freedom, it will lose that freedom; and the irony of it is that if it is comfort or money that it values more, it will lose that, too.

Somerset Maugham

The responsibilities of an officer are quite analogous to those of a policeman or a fireman. The better he performs his daily task, the less frequently does he have to take direct action.

George Patton

The great lesson to be learned in the battered towns of England and the ruined cities of Germany is that the best way to win a war is to prevent it from occurring. That must be the ultimate end to which our best efforts are devoted. It has been suggested—and wisely so—that this objective is well served by insuring the strength and security of the United States. The United States was founded and has since lived upon principles of tolerance, freedom, and goodwill at home and abroad. Strength based on these principles is no threat to world peace. Prevention of war will not come from neglect of strength or lack of foresight or alertness on our part. Those who contemplate evil and aggression find encouragement in such neglect. Hitler relied heavily upon it.

US Strategic Bombing Survey, Summary Report (Europe)

Were there a strategic exchange in which American forces responded poorly, for whatever reason, America would be destroyed as a civilization—and so would the Soviet Union. If our forces responded perfecily, then the result would be—America would be destroyed as a civilized society, and so would the Soviet Union. The result of a nuclear war, regardless of the inefficiency of either side in executing their attack, is massive destruction of both societies. We must build a wider

understanding of the importance of deterrence and the logic of building forces that deter effectively . . . it is a major undertaking. It will take years.

Larry Welch

If we are living in a world where either side can make a surprise attack upon the other which destroys the latter's capability to make a meaningful retaliation, then it makes sense to be trigger-happy with one's strategic air power. But if, on the other hand, the situation is such that neither side can hope to eliminate the retaliatory power of the other, that restraint which was suicidal in one situation now becomes prudence, and it is trigger-happiness that becomes suicidal.

Bernard Brodie

America must maintain a state of readiness for defense and counterattack. This is not just for the sake of being prepared. Of equal or greater importance is the fact that the *visibility* of our preparedness will deter attacks against us.

Curtis E. LeMay

Forces that cannot win will not deter.

Nathan F. Twining

The only war a nation can really win is the one that never starts.

Hoyt Vandenberg

Deterrence is not just aircraft on alert and missiles in the silos. It is not defined by the size of the defense budget. It is a product of both capability and credibility.

Jerome F. O'Malley

Deterrence now means something as a strategic policy only when we are fairly confident that the retaliatory instrument on which it relies will not be called to function at all. Nevertheless, that instrument has to be maintained at a high pitch of efficiency and readiness and constantly improved, which can be done only at a high cost to the community and great dedication on the part of the personnel directly involved.

Bernard Brodie

WARNING

A nation, regardless of its protestations, if it feels that its national existence is threatened and that it is losing a war, will turn to any weapon that it can use.

Walter Bedell Smith

There will always be time enough to die; like a drowning man who will clutch instinctively at a straw, it is the natural law of the moral world that a nation that finds itself on the brink of an abyss will try to save itself by any means.

Clausewitz

When you surround an army, leave an outlet free. Do not press a desperate foe too hard.

Sun Tzu

Friction, War's Resistant Medium

Everything is very simple in war, but the simplest thing is difficult. These difficulties accumulate and produce a friction which no man can imagine exactly who has not seen war.

Clausewitz

If one has never personally experienced war, one cannot understand in what the difficulties constantly mentioned really consist, nor why a commander should need any brilliance and exceptional ability.

Clausewitz

Only the study of military history is capable of giving those who have no experience of their own a clear picture of what I have just called the friction of the whole machine.

Clausewitz

It is a doctrine of war not to assume the enemy will not come, but rather to rely on one's readiness to meet him; not to presume that he will not attack, but rather to make one's self invincible.

Sun Tzu

There is no security on this earth; there is only opportunity.

Douglas MacArthur

War is composed of nothing but accidents, and though holding to general principles, a general should never lose sight of everything to enable him to profit from these accidents; that is the mark of genius.

Napoléon

War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty. A sensitive and discriminating judgment is called for; a skilled intelligence to scent out the truth.

Clausewitz

Clausewitz framed the notion of friction in war in chapter 7, book 1, of On War. *This three-page-long chapter is essential reading for any military professional.*

Oils for the Friction of War

Now is there, then, no kind of oil which is capable of diminishing this friction? Only one, and that one is not always available at the will of the Commander or his Army. It is the habituation of an Army to War.

Clausewitz

Clausewitz corrected the notion that habituation was the sole remedy for the friction of war by prescribing leadership as a second remedy. Other remedies include: understanding war's uncertainty, professional training, exercises that include friction, war games and thought exercises, maintaining alternatives, maintaining reserves, plans that provide room for frictional results, mental agility, organizational agility, clarity of purpose, judicious use of the initiative, and the compound lubricants of mental clarity, originality, discipline, and doctrine.

If one can increase the fog and friction encountered by the enemy, the more likely it is that the enemy will be defeated. Flexible plans with alternative objectives, counterintelligence, disinformation, deception, concealment, and campaigns to disrupt the enemy . . . can not only lead to serious errors by the enemy on the battlefield, but can also cause confusion and uncertainty that lowers morale, saps

aggressiveness, causes tentativeness, and undermines initiative.

Dennis Drew and Donald Snow

The friction of war stems from the magnified results of fundamental uncertainties.

You will usually find that the enemy has three courses open to him, and of these he will adopt the fourth.

Moltke, The Elder

For want of a nail, the shoe was lost;
For want of a shoe, the horse was lost;
For want of a horse, the rider was lost;
For want of a rider, the battle was lost.

Benjamin Franklin

The tiniest deviations at the beginning of a motion can lead to huge differences at later times—in other words, miniscule causes can produce enormous effects after a certain time interval. Of course we know from everyday life that this is *occasionally* the case; the investigation of dynamical systems has shown us that this is *typical* of natural processes.

Gert Eilenberger

Wars spring from unseen and generally insignificant causes, the first outbreak being often but an explosion of anger.

Thucydides

In war, important events result from trivial causes.

Julius Caesar

A battle sometimes decides everything; and sometimes the most trifling thing decides the fate of a battle.

Napoléon

In wars throughout history, events have generally proved the pre-hostilities calculations of both sides, victor as well as loser, to have been seriously wrong.

Bernard Brodie

All action in war is directed on probable, not certain, results. Whatever is wanting in certainty must always be left to fate, or chance, call it which you will. We may demand that what is so left should be as little as possible, but only in relation to the particular case—that is, as little as possible in this one case, but not that the case in which the least is left to chance is always to be preferred. That would be an enormous error. There are cases in which the greatest daring is the greatest wisdom.

Clausewitz

Uncertainty and the Art of Circumstances

The most important thing is to have a flexible approach. . . . The truth is no one knows exactly what air fighting will be like in the future. We can't say anything will stay as it is, but we also can't be sure the future will conform to particular theories, which so often, between the wars, have proved wrong.

Robin Olds

To refrain from intercepting an enemy whose banners are in perfect order, to refrain from attacking an army drawn up in calm and confident array—this is the art of studying circumstances.

Sun Tzu

Do not swallow a bait offered by the enemy.

Sun Tzu

In his many battles his tactical genius is apparent in the lightning-like speed with which he adapted his actions to novel circumstances.

J. F. C. Fuller on
Alexander the Great

Whether or not air power, despite being cast in an ancillary role, should attempt to pursue an independent strategy conforming to its own conception of the need of the forces it is supporting is a big question which ought to be left to specialists. It involves the old and much-debated question of close support versus interdiction, about which there has been much doctrinaire argument. The Korean experience and the campaigns of World War II suggest that the issue is affected most by the circumstances of the occasion.

Bernard Brodie

The carrying out of a plan, from its very beginning to the conclusion of an operation, is another process of knowing the situation; i.e., the process of putting it into practice. In this process, there is need to examine anew whether the plan corresponds with the actualities. If the plan does not correspond or does not fully correspond with them, then we must, according to fresh knowledge, form new judgments and make new decisions to modify the original plan in order to meet the new situation.

Mao Tse-tung

It is above all necessary that a general should adopt a role proportionate to his capacity, a plan that he feels himself able to follow out methodically amidst dangers, surprise, friction, accidents of all sorts.

Jean Colin

The truths of war are absolute, but the principles governing their application have to be deduced on each occasion from the circumstances, which are always different.

Winston Churchill

One falls into a feeling of security by mental laziness and through lack of calculation concerning the intentions of the enemy.

To proceed properly it is necessary to put oneself in his place and say: What would I do if I were the enemy? What project would I form? Make as many as possible of these projects, examine them all, and above all reflect on the means to avert them. But do not let these calculations make you timid. Circumspection is good only up to a certain point.

Frederick the Great

Technology

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Impact

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

Douhet

In this increasingly competitive, often hostile and rapidly changing world, Americans seem to have only one real choice. Clearly our national well-being cannot be based on unlimited raw materials or on unlimited manpower and cheap labor. Rather it must be based on our ability to multiply and enhance the limited natural and human resources we do have. Technology thus appears to offer us our place in the sun—the means to insure our security and economic vitality.

Dr Malcolm Currie

Yet there are dangers in allowing oneself to become mesmerized by technological promise. It is often much easier to make technological decisions than it is to make social or political decisions.

Jonathan Alford

It may be said that warfare has acquired a new phase—technological war. In the past, research and development were only preparation for the final and decisive testing of new systems in battle. Today the kind and quality of systems which a nation develops can decide the battle in advance and make the final conflict a mere formality—or can bypass conflict altogether.

Bernard Schriever

In the development of air power, one has to look ahead and not backward and figure out what is going to happen, not too much what has happened.

Billy Mitchell

So long as there remains a substantial period (often up to ten years) between the inception of a new weapon system and its deployment, even the very latest weapons are out of date in terms of what technology could deliver.

Jonathan Alford

The first essential of the airpower necessary for our national security is preeminence in research. The imagination and inventive genius of our people—in industry, in the universities, in the armed services, and throughout the nation—must have free play, incentive, and every encouragement. American air superiority in this war has resulted in large measure from the mobilization and constant application of our scientific resources.

"Hap" Arnold

We should base our security upon military formations which make maximum use of science and technology in order to minimize numbers of men.

Dwight D. Eisenhower

The most signal contribution made by Alfred Thayer Mahan in the field of military doctrine was his recognition that the conduct of war changes rapidly with technological advance. Weapons, he said, advance faster than the tactics and concepts of war for employing those weapons. Thus military systems always lag behind weapon capabilities.

Dale O. Smith

Performance means initiative—the most valuable moral and practical asset in any form of war.

Sholto Douglas

Another debate concerns the interaction of technology and doctrine: Which should be paramount? Should technology serve doctrine and so produce weapons that fit preconceptions and prejudices? Or should doctrine be adapted to make best use of what technology has to offer?

Jonathan Alford

In England the great need in the earlier days of the war was for interceptors designed for maximum climb, maneuverability and speed. These were perfect for bringing down German bombers over England. But how different is air war in 1943 when we are sending our bombers by the hundreds over

Germany. The requirements are now focused on the matter of longer fighting range.

"Hap" Arnold

New conditions require, for solution—and new weapons require, for maximum application—new and imaginative methods. Wars are never won in the past.

Douglas MacArthur

An air force is always verging on obsolescence and, in time of peace, its size and replacement rate will always be inadequate to meet the full demands of war. Military air power should, therefore, be measured to a large extent by the ability of the existing air force to absorb in time of emergency the increase required by war together with new ideas and techniques.

"Hap" Arnold

In many instances the information displayed for the commander, when traced back to its origins, rests upon an assumption, an estimate, or an extrapolation of data derived from a field trial of some weapon or item of equipment. Commanders, who have seldom participated in deriving the algorithms by which the information on display before them was drawn, tend to accept the given data as reliable fact, especially when the data are presented in numerical form. These soft links in the chain of remote inputs are fatally easy to overlook.

I. B. Holley, Jr.

best copy available

Effects of Introducing Technology

The development of a new weapon is generally hindered by a kind of enthusiasm that concentrates attention on maximum capabilities in performance. This particular kind of violation of the law of diminishing return incurs the penalties [of two] mistakes—premature use and failure to exploit initial gains.

J. M. Cameron

The bias toward the offensive creates special problems in any technologically new situation where there is little or no relevant war experience to help one reach a balanced judgment.

Bernard Brodie

Out of the 16,000 V1s launched against England and the Low Countries in 1944–5, nearly 7,000 were to be destroyed by fighters, anti-aircraft guns, or barrage balloons. Yet the first waves suffered only 2 per cent attrition. Within a week, however, near to 50 per cent was being registered. Towards the end of the attacks on England, anti-aircraft batteries were shooting down up to 80 per cent of those V1s that crossed their sights.

Neville Brown

We know from even the most casual study of military history how fallible man is in matters concerning war and how difficult it has been for him, mostly because of the discontinuity of wars, to adjust to new weapons. Yet compared to the changes we consider now, those of the past, when measured from one war to the next, were almost trivial. And almost always in the past there was time even after hostilities began for the significance of technological changes to be learned and appreciated.

Bernard Brodie

Cumulative Effects of Technical Changes

Within a given sector, the improvement of overall performance will stay gradual for quite a while but then become ever more rapid. Then it will progressively slow down again, as the said technology matures. Both the acceleration and the retardation are likely to start quite suddenly.

Progress in a particular direction, aircraft speed or whatever, is usually registered via a diversity of increments (more exotic fuel, innovations in engine design, improved wings and so on). Nonetheless, the cumulative result is likely to approximate a sigmoid curve [of sudden acceleration and deceleration].

Neville Brown

The Allies proved that extermination raids of strategical importance were possible. The components of their success were: (1) Concentration of raiding forces on one target. (2) Combination of day and night raids.(3) Simultaneous application of new means and methods: radar interference, bomber-stream, etc.

Adolf Galland

Using all four survivability strategies—fast reaction coupled with warning, dispersal, hardening, and mobility—SAC can be certain that a sufficient percentage of its strike forces, as well as their command and control, will survive under any circumstances to retain superior strike capability.

Thomas S. Power

Technology and Numbers

We have never been likely to get into trouble by having an extra thousand or two of up-to-date airplanes at our disposal. As the man whose mother-in-law had died in Brazil replied, when asked how the remains should be disposed of, "Embalm, cremate, and bury. Take no risks."

Winston Churchill, April 1938

One can never have too many guns; one never has enough.

Napoléon

The burning wreck of one aircraft or one white parachute spilling out against the sky were often glimpsed by many pilots when they twisted and turned five miles high. There can be no doubt that in the confused and intricate air fighting, many of our claims were duplicated, but, wisely, those in authority were not concerned with mere numbers, but with the greater issues of whether or not the Luftwaffe was being held at bay.

"Johnnie" Johnson

Records previously thought to reveal that anti-aircraft artillery was twice as effective in coastal locations as when it was employed deeper inland were persuasively reinterpreted to show that

[the results] were due to the impossibility in that environment of checking gunners' claims against the number of crashed enemy aircraft subsequently discovered.

Neville Brown

Some of the areas where our modeling of air combat greatly needs improvement:

- Lethality—too often overestimated.
- Command creativity—too often neglected.
- Employment strategy options—too often ignored.

Wilfred L. Goodson

The hope of the wisdom essential to the general direction of men's affairs lies not so much in wealth of specialized knowledge as in the habits and skills required to handle problems involving very diverse viewpoints which must be related to new concrete situations. Wisdom is based on broad understanding in perspective. It is never the product of scientific, technological, or other specializations, though men so trained may, of course, acquire it.

Wallace B. Donham

It is true that [in Germany in World War II] unheard-of inventions and progress were made in individual fields, far ahead of the rest of the world, but they all came too late and, . . . they came in such small numbers that they could no longer be decisive.

Karl Koller

Reactions to Technology

The great bomber can use weapons other than the hydrogen bomb, just as the policeman can discard his pistol for the truncheon.

J. C. Slessor

If a man's trust is in a robot that will go around the earth of its own volition and utterly destroy even the largest cities on impact, he is still pitiably vulnerable to the enemy who appears on his doorstep, equipped and willing to cut his throat with a penknife, or beat him to death with a cobblestone. It is well to remember two things: no weapon is absolute, and the second of even greater import—no weapon, whose potential is once recognized as of any degree of value, ever becomes obsolete.

J. M. Cameron

No form of transportation ever really dies out. Every new form is an addition to, and not a substitution for, an old form of transportation.

Air Marshal Trenchard

When offensive weapons make a sudden advance in efficiency, the reaction of the side which has none is to disperse, to thin out, to fall back on

medieval guerrilla tactics which would appear childish if they did not rapidly prove to have excellent results.

Gen G. J. M. Chassin

For the wealthy nation, the probability of loss exceeds the possibility of gain and dictates its role as the defender. The unburdened opponent, enjoying the prospect of gain for comparatively insignificant loss, retains the initiative. He may endlessly alternate threat of action with pretense of compromise and continue no wise in danger of diminishment. When the utmost possible gain is achieved in this way, he may still attack at his own discretion.

J. M. Cameron

The highly sophisticated industrial economy of the advanced nations of the world, the degree of urbanization of their demographic distribution, and the high standard of living, make them very sensitive to weapons of mass annihilation and area destruction. On the other hand, the underdeveloped areas of the world display a hardening of conflict when faced with such weapons and resort to guerrilla warfare, where man is superior to machine. . . . People used to high material standards of living are most unlikely to harden their will in the face of mass annihilation and area destruction and resort to guerrilla warfare.

S. T. Das

It is sufficiently proved in history that rude and semi-barbarous nations, ill-armed and with little of what is called discipline, often discomfit the systematic armies of scientific technicians and accomplished generals.

Robert Jackson

The scientific and technical talents of the contemporary world are spread rather evenly among all potential contenders. This means that whoever invents whatever new device to supplement his power, the other will not be long in shaping it himself for his own uses. While he is doing it, his primary interest will be not in bringing the device to maximum effectiveness, but in the study of it for deficiencies.

J. M. Cameron

For over a month after the V-1s began to fall, interception was poor and most missiles reached London. Through desperate efforts the defense system eventually attained a ninety per cent efficiency. Yet this improvement was gained more through revised techniques and coordinated teamwork than through the introduction of new technology.

We expected the V-1s to bombard Antwerp after we had taken that city for our principal European port of supply, and hence we set up the most formidable air-raid defense system ever devised. Nothing was spared to make it work. The buzz bombs came as predicted. Again, over a month of operational development was necessary before

the efficiency level was raised to the point where most of the V-1s dispatched against us were destroyed.

All this . . . illustrates that what is technically feasible is not necessarily tactically possible.

Dale O. Smith

Principles of War

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Foundation

If there were a college degree in War, the required "foundation" courses might be the commonly accepted principles of war. We've included some useful "electives" at the end, as well.

Principles of War are only the principles of common sense applied to war.

J. C. Slessor in a lecture to
Air War College, 1957

The ideas about strategy which have evolved from time to time no sooner gained acceptance than they were stripped to their barest essentials and converted into maxims or, as they have latterly come to be called, "principles." The baggage that was stripped normally contained the justifications, the qualifications, and the instances of historical application or misapplication.

Bernard Brodie

Principles of war, though they can be simply stated, are not easy to learn, and can never be learned from books alone. They are the principles of human nature; and whoever learned from books how to deal successfully with his fellows? War which drives human nature to its last resources is a great

engine of education, teaching no lessons which it does not illustrate, and enforcing all its lessons by bitter penalties.

Walter Raleigh in *War in the Air*

The primary elements of tactics are to be seen in their simplest form in a fight between two unarmed men. They are: to think, to guard, to move, and to hit.

Before a bout opens, each man must consider how best to knock out his adversary, and though as the fight proceeds he may be compelled to modify his means, he must never abandon his aim. At the start he must assume a defensive attitude until he has measured up his opponent. Next he must move under cover of his defence, he must assume the offensive and attempt to knock him out. In military terms, the four primary tactical elements are: the aim or object, security, mobility and offensive power.

If the two pugilists are skilled in their art, they will recognize the value of three accentuating elements. They will economize their physical force, so as not to exhaust themselves prematurely; they will concentrate their blows against the decisive point selected, the left or right of their opponent's jaw, or his solar plexus, and throughout will attempt to surprise him—that is, take him off-guard, or do something which he does not expect or cannot guard against. In military terms these accentuating elements are: economy of force, concentration of force, and surprise.

J. F. C. Fuller

It should be remembered that the statements of the Principles of War were derived from study of surface operations and written by soldiers with ground warfare in mind. They stem from periods of history when the airplane existed only in the minds of men.

Nathan F. Twining quoting a
1947 Air War College seminar

Too often we see the principles of war regarded as instruments applicable by man, rather than as limits to his choice of actions. The constantly cited nine principles of war are honored about equally among them by misapplication and misunderstanding. Their authority dare not be challenged, however, and they are to be recognized as masters rather than servants. Like all good masters, their bounty makes them seem as servants when properly obeyed. When their demands are ignored, their punishments are justly severe.

J. M. Cameron

Objective

The principle of the Objective means, foremost, that military operations must be consciously aimed at an understood purpose. Because the operations of each echelon of command are aimed at distinct, feasible, and normally measurable goals (take that hill, destroy that bridge), there is a tendency to confuse the task or target with the actual object of an operation.

The ordinary man is much more likely to do the right thing if he really understands why he is doing it, and what will probably happen if he does something else; and the best basis for sound judgment is a knowledge of what has been done in the past, and with what results.

J. C. Slessor

General MacArthur approved [my] program and said to go ahead, that I had carte blanche to do anything that I wanted to do. He said he didn't care how my gang was handled, how they looked, how they dressed, how they behaved, or what they did, so long as they would fight, shoot down [Japanese airplanes], and put bombs on the target.

George Kenney

The mission of tactical fighter and fighter-bomber units is to engage in operational missions, as directed by higher echelons within the theater air structure. These operations may be independent of or in conjunction with surface action, but in any event are all directed toward the effective, efficient, and economical accomplishment of the theater commander's assigned mission.

Air Force Manual 51-44, 1953

There were two extremely important points about him [Yamamoto] as a commander. First, he made the objectives of the operation extremely clear, and he expressed them with indomitable will. Second, although he did not permit any criticism of the objectives of the operation, he entrusted the details of its execution to the discretion of his subordinates.

Lt Gen Minoru Genda

This process of separating strategy into three compartments I believe to be fundamentally uneconomical and a direct violation of the principle of economy of forces as applied to a united army, navy, and air force, and hence a weakening of the principle of the objective.

J. F. C. Fuller

Successful operations depend on the entire wing organization working as a team with but one purpose in mind. The purpose, of course, is to make certain of the destruction of the selected target at exactly the right time and place. All of the years of planning and training, and the great

financial and personal costs and sacrifice, will be vindicated by the successful execution of the mission; likewise, all will be wasted by failure, regardless of its cause.

Air Force Manual 51-44, 1953

An irresolute general who acts without principles and without plan, even though he lead an army numerically superior to that of the enemy, almost always finds himself inferior to the latter on the field of battle. Fumblings, the middle course, lose all in war.

Napoléon

CAUTION

At the same time, the nature of the enemy and the immediate threat he poses to national and friendly forces, demand action that may distract full commitment to one's own objectives.

S. T. Das

Unity of Command

There is a weakness in a council running a war. That is true of any council. I don't care if it is composed of the best men in the world. . . . In war, you must have decision. A bum decision is better than none. And the trouble is that when you get three, you finally get none.

Dwight Eisenhower

The compromise which forms the mean between several plans usually combines their faults rather than their merits.

Sir Charles Oman

The Admiral and General appointed to command the hastily organized "conjunct expedition" to Norway in April 1940 were given no clear indication of what the government's purposes were, and did not even know which of them was in supreme command. It is not surprising that the undertaking ended in a fiasco.

S. W. Roskill

Nothing is more important in war than unity in command.

Napoléon

My observation is [that] where one person is found adequate to the discharge of a duty by close application, it is worse executed by two and scarcely done at all by three.

Friedrich von Steuben

The same consequences which have uniformly attended long discussions and councils of war will follow at all times. They will end in adoption of the worst course, which in war is always the most timid, or, if you will, the most prudent. The only true wisdom in a general is determined courage.

Napoléon

An educated guess is just as accurate and far faster than compiled errors.

George Patton

Unity of command is not alone sufficient. Unity of planning, unity of common item procurement, and unity of doctrine are equally necessary.

"Hap" Arnold

It appears that, when Germany determined to go into Norway, the staff of the supreme command determined what proportion of air, ground, and sea elements should comprise this expeditionary force. It then designated a commander and thereafter there was complete unity of command, and no interference from the three arms of the service thus

combined. Here is a lesson which we must study well.

Maj Gen "Hap" Arnold and
Col Ira C. Eaker in *Winged Warfare*, 1941

Perhaps the clearest example of the consequences of divided command is given by Thucydides, describing the Athenian compromise plan to invade Syracuse. Three competent generals—Nicias, Lamachus, and Alcibiades—proposed three different but promising strategies. The Athenian government sent all three to take Syracuse, possibly hoping they would agree on a "best" plan. When Alcibiades was recalled, the other two adopted a plan halfway between their two original designs. Its failure led to the end of the Athenian state.

We are seemingly still in the period of transition Douhet described in 1928. . . . He said then that there were men competent to wage war on land, others to wage war at sea, and still others to wage war in the air, but that there were not yet men competent to wage war in general.

Louis A. Sigaud, 1941

Offensive, Initiative, and Surprise

The power of the initiative might be related to the principle of surprise. Without initiative, the best one can do is to hold one's own. With the power of the initiative, the opposition can be destroyed. It would therefore seem axiomatic that the first principle of our national security policy would be to seize and maintain the initiative in all dimensions of modern war; to include the economic, psychological, political, military, and the technological.

Nathan Twining

Offense is the essence of air power.

"Hap" Arnold

True offensive doctrine consists of creating favorable situations when they do not otherwise exist, striking at the enemy with the maximum power at the decisive time and place, and driving home the effort determinedly until the desired results have been accomplished.

Air Force Manual 51-44, 1953

The offensive knows what it wants, whereas the defensive is in a state of uncertainty.

S. T. Das paraphrasing Moltke, The Elder

The advantage of the offensive in war is obvious: it disorganizes the enemy, upsets his plans and combinations; the assailant, to some extent, imposes on him his initiative, his will.

Jean Colin

Military officers are trained not to be objective. They are trained to be biased in favor of the offensive, much as ordinary persons are trained to be biased in favor of virtue.

The bias toward the offensive creates special problems in any technologically new situation where there is little or no relevant war experience to help one to reach a balanced judgment.

Bernard Brodie

In order to have rest oneself it is necessary to keep the enemy occupied.

Frederick the Great

Air forces characteristically take the offensive. Even in defense, they defeat an invading enemy by attack.

Air University Manual 1, 1951

Success is to be obtained only by simultaneous efforts, directed upon a given point, sustained with constancy, and executed with decision.

Archduke Charles of Austria

Static and dynamic analyses of the military balance are deceptive bases for defense planning if they are abstracted from the political, psychological, and doctrinal uncertainties that would attend the outbreak of conflict. For hedging against sudden attack, less promise lies in solutions aimed at reducing the probability of surprise than in those that make plans, strategies, and operational doctrines effective if surprise occurs.

Richard K. Betts

The Offensive Aim

To strike with strong effect, one must strike at weakness.

Liddell Hart

In place of hitting at a *vital* spot, however tough, they committed the deadly tactical sin of looking for a soft spot.

J. F. C. Fuller describing a
World War I battle

Hold out baits to entice the enemy. . . . Amid the turmoil and tumult of battle, there may be seeming disorder and yet no disorder at all; amid confusion and chaos, your array may be without head or tail, yet it will be proof against defeat.

Simulated disorder postulates perfect discipline; simulated fear postulates courage; simulated weakness postulates strength.

Sun Tzu

The Defender's Dilemma

The spot where we intend to fight must not be made known; for then the enemy will have to prepare against a possible attack at several different points; and his forces being thus distributed in many different directions, the numbers we shall have to face at any given point will be proportionately few.

Sun Tzu

Petty geniuses attempt to hold everything; wise men hold fast to the key points. They parry great blows and scorn little accidents. There is an ancient apothegm: he who would preserve everything, preserves nothing. Therefore, always sacrifice the bagatelle and pursue the essential.

Frederick the Great

[The French army in Vietnam] suffers from the considerable disadvantage attaching to those who seek to protect and preserve rather than simply destroy. It is much easier to cut a railway line or blow up a bridge than to protect them from destruction.

Gen G. J. M. Chassin, 1952

The general is skillful in attack whose opponent does not know what to defend; and he is skillful in defense whose opponent does not know what to attack.

Sun Tzu

Limits of the Offensive

War is a two-party affair, so imposing the need that while hitting one must guard. Its corollary is that, in order to hit with effect, the enemy must be taken off his guard. Effective concentration can only be obtained when the opposing forces are dispersed; and usually, in order to ensure this, one's own forces must be widely distributed. Thus, by an outward paradox, true concentration is the product of dispersion.

Liddell Hart

The best method of dealing with the enemy's bombers—as with his fighters—will normally be the maintenance of an active offensive. On the other hand, it is dangerous to make a fetish of any principle or to become the slave of any tactical doctrine as the French did in 1914. Just as it may sometimes be necessary to divert temporarily even the whole of our air forces to the *strategically* defensive role for reasons of security, so on occasions we may be compelled for the same reason to divert part of our fighter strength to the *tactical* defensive.

J. C. Slessor, 1936

Military organizations generally prefer offensive doctrines because they reduce uncertainty and enhance military autonomy and resources. But . . . because military organizations seek autonomy, their offensive doctrines are usually poorly

integrated with the political aspects of grand strategy.

Daniel J. Hughes summarizing points from
Barry P. Posen's *The Sources of Military Doctrine*

The offensive, however, is the more exhausting form of action. Nothing does more ruin to a force or a nation than offensives which show no profit commensurate with their cost. The sands of history are littered with the wrecks of States which set their compass on an offensive course only.

S. T. Das

Using the Initiative: Agitation

Offensive action has often been used to provoke reactions, to force an opponent to make mistakes. Just as certainly, one's enemies are likely to try probing and stirring in return.

Agitate the enemy and ascertain the pattern of his movement. Determine his dispositions and so ascertain the field of battle. Probe him and learn where his strength is abundant and where deficient.

Sun Tzu

Attacks on the decision element of command are limited only by the imagination. They can range from direct strikes at enemy command posts to

complex operations to mislead the enemy and induce him to do something inappropriate.

John A. Warden III in *The Air Campaign*

I started shooting when I was much too far away. That was merely a trick of mine. I did not mean so much to hit him as to frighten him, and I succeeded in catching him. He began flying in curves and this enabled me to draw near.

Manfred von Richthofen

Using the Initiative: Alternatives

Maintaining sensible alternatives is like taking a good stance in sports; the purpose is to preserve the benefits of the initiative.

If the enemy is certain as to your point of aim he has the best possible chance of guarding himself—and blunting your weapon. If, on the other hand, you take a line that threatens alternative objectives, you distract his mind and forces.

Liddell Hart

The question "Where should the decisive point be sought?" does not arise; the question is, "How can a preponderance of force be brought against the enemy's will?"

There are two answers to this question: to do something which the enemy cannot prevent, and to do something which he does not suspect.

J. F. C. Fuller

Place your camp in such a manner that if the enemy passes on your right or on your left, the terrain will give you an equal advantage.

Frederick the Great

The Offensive Spirit

No guts, no glory. If you are going to shoot him down, you have to get in there and mix it up with him.

Fred C. ("Boots") Blesse

I always thought to go around in circles, slower and slower, was a ridiculous thing. . . . It's not the way to fight. The best tactic is to make a pass, then break off and come back. if you don't do this you'll lose people. One can't be greedy.

Robin Olds

When we study the lives of the great captains, and not merely their victories and defeats, what do we discover? That the mainspring within them was *originality,* outwardly expressing itself in unexpected actions.

J. F. C. Fuller

Originality is the most vital of all military virtues as two thousand years of history attest. In peace it is at a discount, for it causes the disturbance of comfortable ways without producing dividends, as

in civil life. But in war, originality bears a higher premium than it can ever do in a civil profession.

Liddell Hart

Never forget that no military leader has ever become great without audacity.

Clausewitz

I approve of all methods of attacking provided they are directed at the point where the enemy's army is weakest and where the terrain favors them the least.

Frederick the Great

An aggressive act in the initial phases of the attack will very often give you a breather and a head start home. . . . Showing a willingness to fight often discourages the enemy even when he outnumbers us, while on the other hand I have, by immediately breaking for the deck on other occasions, given the enemy a "shot in the arm," turning his half-hearted attack into an aggressive one.

John C. Meyer

Mass, Concentration, and Economy of Force

The alternative to massing forces is piecemeal employment—a practice summarized by the phrase "defeat in detail."

We had been taught a lesson, brutally and unmistakably. The first round in modern war takes place in the air—the fight for air superiority; and to be successful one must have reasonable strength in quantity as well as quality, and one's air bases must have security—the security given by warning systems, by dispersal, by protection and by guns. In Greece and Crete we had none of these things. The lesson is clear. It was no use having a victorious and predominant surface fleet if it was not free to operate because we had lost control of the air; it was no use having a strong army if, for the same reason, it could not be supplied and maintained.

Lord Tedder

One of the best examples of Mass and Economy of Force is the Battle of the Bismarck Sea. General Kenney's long-range aircraft were massed to attack the Japanese convoy as it approached New Guinea. Kenney used his short-range aircraft, incapable of joining the mass, to attack Japanese airfields in New Guinea and

prevent air interception just before the main attack began. The use of small supporting forces to lend disproportionate assistance to the main effort—not unwise division of forces—is typical of the specialized support functions of diversion, deception, scouting, and feints. Supporting actions that actually add weight to the main action demonstrate the positive application of the principle of Economy of Force.

The principles of war could, for brevity, be condensed into a single word: concentration.

Liddell Hart

One of the guiding principles of fighting with an air force is the assembling of weight, by numbers, of a numerical concentration at decisive spots.

Adolf Galland

The principles of Mass were better stated: "Mass is the concentration of *optimum* combat power selected from the available maximum, to be used at a critical time and place."

J. M. Cameron

Numerical weakness comes from having to prepare against possible attacks; numerical strength, from compelling our adversary to make these preparations against us.

Sun Tzu

The effect of superior numbers in a decision to attack is small. The tactical advantage of position – altitude – sun – and direction of attack are the influencing factors.

John C. Meyer

History shows again and again that a combination of Resistance and Mobility—of Shield and Sword—is the true answer to Mass.

J. F. C. Fuller

Whereas to shift the weight of effort on the ground from one point to another takes time, the flexibility inherent in Air Forces permits them without change of base to be switched from one objective to another in the theatre of operations. So long as this is realised then the whole weight of the available air power can be used in selected areas in turn. This concentrated use of the air striking force is a battle winning factor of the first importance. It follows that control of the available air power must be centralised and command must be exercised through Air Force channels. Nothing could be more fatal to successful results than to dissipate the air resources into small packets placed under command of land formation commanders, with each packet working on its own plan. The soldier must not expect or wish to exercise direct command over air striking forces.

Field Marshal Montgomery

Economy of Force

The use and expenditure of forces in all the transactions of nature is governed by the laws of parsimony. From the boundless reservoir attendant to her needs, nature will apply the precise minimum of her resources that will effect her purpose. Translated into human values the law of parsimony becomes a constellation of principles the most conspicuous of which is the law of diminishing return. It allows for human error in that it punishes infraction discriminately according to the magnitude of the crime. It is an excellent model for ruling the expenditure of military strength.

There can in all things be too much of a good thing. Beyond the optimum every added increment of effort will result in a corresponding decline of accomplishment.

J. M. Cameron

The principle of Economy of Force is sometimes misunderstood as holding back a large body of troops and committing the minimum force to battle. This is not the true interpretation or application of the law. To hold back troops when they can be gainfully employed is false economy. The use of reserves on the other hand is a tactical application of the same principle. When information is lacking or the situation is such that only after the initial engagement can the enemy's weak spot be

discovered, in such cases reserves are not really held back from the battle but are actually kept ready for battle when the decisive time and place has been reached.

S. T. Das

Economy of Force rightly means, not a mere husbanding of one's resources of manpower, but the employment of one's force, both men and weapons, in accordance with the economic laws, so as to yield the highest possible dividends of success in proportion to strength.

Liddell Hart

In planning, never a useless move; in strategy, no step taken in vain.

Chen Hao

A part must never be improved at the expense of the whole.

J. M. Cameron

Economy of Force is the supreme law of successful war because in a trial of strength a nation's capacity to stand the strain depends not merely on the extent of its resources, but on their economic distribution.

Liddell Hart

It was the strategy employed by raiders since naval war began, to strike in one area until the strength of the enemy was directed thither, and then to slip away and start again in a fresh unguarded area.

C. S. Forester in *The Age of Fighting Sail*

The principles of mobility and concentration of force were considered to be contradictory elements of principles of war till the arrival of airpower. Today the exponents of airpower maintain that the principles of offensive and economy of force can be achieved effectively only by the exploitation of airspace, whereas prior to the emergence of airpower the principle of offensive could only be applied by maintaining a 4-to-1 ratio over the enemy forces.

S. T. Das

There are generally insufficient forces to conduct extensive operations in all air tasks at one time; thus the selection of targets and the allocation of effort must be in terms of the needs of the theater. Enemy action may necessitate a major revision in task priorities.

Air Force Manual 1-3, 1953

To me an unnecessary action, or shot, or casualty, was not only waste but sin.

T. E. Lawrence

Maneuver and Mobility

The enemy must not know where I intend to give battle. For if he does not know where I intend to give battle, he must prepare in a great many places. . . . For if he prepares to the front his rear will be weak, and if to the rear, his front will be fragile. If he prepares to the left his right will be vulnerable and if to the right, there will be few on the left. And when he prepares everywhere he will be weak everywhere.

Sun Tzu

The ultimate object of mobility is to obtain superior power in battle.

Maurice de Saxe

I believe that, more or less, all of the Allied operations [in the Southwest Pacific] depended on deception by landing in places where we thought a landing and the building of airfields impossible.

Lt Col Masaru Shinohara,
Japanese Eighth Area Army

Modern war is a war for airbases; the bulldozer must accompany the plane. . . . One of the elements of victory in North Africa was the speed

with which our aviation engineers constructed airfields behind the front lines and pressed the attack.

"Hap" Arnold

Maximum time over target or extreme depth of penetration may be necessary. This normally requires that aircraft be based as close to the target areas as possible. Since ground action is often fluid in nature, tactical air units must possess a considerable degree of mobility. It is essential that all components of the tactical air organization, including supporting or service units, be able to move from site to site without disrupting the combat mission. Equipment should be designed with this in mind and, whenever possible, be air transportable.

Air Force Manual 51-44, 1953

The giant airbases of today will become the bomber cemeteries of a future war.

Gen P. F. Zhigarev, Soviet Air Forces, 1958

The strength of air forces lies in mobility and flexibility. These characteristics permit concentration of massed firepower at the place and time dictated by the situation with maximum surprise. Mobility and flexibility are reduced when:

a. Air forces are compartmented in separate units under separate commands, and

b. Are allotted to lower echelons.

Air University Manual 1, 1951

Simplicity

Perhaps the most important principle when transitioning from peace to war, when first employing forces, and when trying new tactics, procedures and techniques in harm's way, is Simplicity.

The ability to distinguish essentials from non-essentials, to grasp quickly the elements of the changing situation, and the intestinal fortitude to keep cool and to continue fighting when the going gets tough are required in the successful war commander.

Adm Raymond A. Spruance

Difficulties always arise from attempts to improve to the point of achieving what is not possible, thereby failing to gain what is well within reach.

J. M. Cameron

The principal message of fog, friction and chance is that strategy must be flexible. Plans that rely on flawless execution are overly susceptible to failure. Plans that rely on rigid timetables and rigidly sequenced actions are overly susceptible to failure.

In general, the more complex the plan, the more likely that something will go awry.

Dennis Drew and Donald Snow

Few orders are best, but they should be followed up with care.

Maurice de Saxe

Remember, gentlemen, an order that can be misunderstood will be misunderstood.

Moltke, The Elder

Security

The whole art of war consists of a well-reasoned and extremely circumspect defensive followed by rapid and audacious attack.

Napoléon

Naturally, the combination of active and passive devices sometimes has proved adequate and sometimes not, depending on circumstances and luck, but the chances for survival were usually better for having a defense which included both kinds.

Bernard Brodie

Skepticism is the mother of security. Even though only fools trust their enemies, prudent persons never do. One falls into a feeling of security after battles, when one is drunk with success, and when one believes the enemy completely disheartened. One falls into a feeling of security when a skillful enemy amuses you with pretended peace proposals. One falls into a feeling of security by mental laziness.

Frederick the Great

Paradoxically, it is the very attachment of the military to the offensive spirit that creates in them a strong impulse to disregard the likelihood that the enemy may have comparable attachments and may therefore attempt to initiate hostile action.

Bernard Brodie

Always presume that the enemy has dangerous designs and always be forehanded with the remedy. But do not let these calculations make you timid.

Frederick the Great

Ideas exalting military aggressiveness derive from an age when it was the same force which took the offensive or stayed on the defensive. If an offensive failed, an impromptu redeployment usually achieved a defensive posture. The accent was therefore appropriately on boldness. Even when boldness proved improvident and costly, it rarely sacrificed the life of the nation. Today, failure to meet the requirements of the deterrent posture can clearly have that result.

Bernard Brodie

Three can keep a secret if two of them are dead.

Benjamin Franklin

Our continuous air offensive had evidently annoyed them, as the raid was made by twenty-four bombers escorted by about the same

number of fighters. We lost eleven aircraft on the ground at Seven Mile Airdrome. In addition, the operations building was burned down, several trucks destroyed, two hundred drums of gasoline went up in smoke, and the runway was hit in several places. The Japanese left eight calling-cards in the shape of long-delay time-fuzed bombs which exploded at intervals all the way up to forty-four hours. Several men were wounded by bomb fragments. Once again our warning service was inadequate.

George Kenney

When the fighting [World War I] was over, Maj Gen Mason M. Patrick, Chief of Air Service, American Expeditionary Forces, wanted to find out what lessons had been learned, what knowledge had been gained by Air Service personnel during the war. He directed that such information was to be sent to Col Edgar S. Gorrell, Assistant Chief of Staff, who was compiling the history of the Air Service, AEF. . . . *No one* was to go home, Patrick said, until he had "furnished in writing to Colonel Gorrell any information of value which he possess[es] and which he has acquired while in the American Air Service. . . ."

Some of the resulting reports were well-written documents, carefully and thoughtfully prepared. Others obviously were dashed off hurriedly to be rid of a distasteful and seemingly nonsensical task as quickly and easily as possible. One unsympathetic squadron adjutant came up with the following form letter response, duly completed and submitted by ten first and second lieutenants:

Date _____ 1918

From: _____
To: Col. Gorrell, Office Chief of Air Service
Subject: Information.

1. In accordance with instructions contained in telegram Z 727 TG, from Chief Training Section, Headquarters Air Service, Tours, the following certificate is submitted.

2. I certify that I have acquired, while in the Air Service, no information of value.

(Signed) _____

Source: Adapted from Maurer Maurer, *The U.S. Air Service in World War I* (Washington, D.C.: Office of Air Force History, Headquarters USAF, 1979), vol. IV, 1–2.

Constants—If Not Principles—of War

Communications

If intercommunications between events in front and ideas behind are not maintained, then two battles will be fought—a mythical headquarters battle and an actual front-line one, in which case the real enemy is to be found in our own headquarters.

J. F. C. Fuller

The tactical skill of the Mongol horde had been developed in the stress of war. In maneuver for battle, they had learnt not to depend on commands given by a voice which very often could not be heard in the uproar of moving mounted men. Regiments signalled their movements by raising black or white flags during the day and by similar use of colored lanterns at night. Other signals were given by the use of whistling arrows which emitted sound through a hollow pierced head. They hid their formations, at times, behind drifting smoke screens.

S. T. Das

Congress can make a general but only communications can make him a *commanding* general.

Omar Bradley

Public Support

In our democracy, where the government is truly an agent of the popular will, military policy is dependent on public opinion, and our organization for war will be good or bad as the public is well informed or poorly informed.

Few Americans learn that we enrolled nearly four hundred thousand men in the Revolutionary War to defeat an enemy that numbered less than forty-five thousand, or that we employed half a million in 1812 against an opponent whose strength never exceeded sixteen thousand at any one place, and fewer still have learned why these overwhelming numbers were so ineffective.

George C. Marshall,
"Our Most Serious Problem"

Except for valid security reasons, any action that cannot be satisfactorily explained to the troops, the Congress, and the general public, should be regarded as suspect and thoroughly examined.

Matthew B. Ridgway

By rapidity many measures of the enemy are nipped in the bud, and public opinion is gained in our favor.

Clausewitz

It is strange that except by Clausewitz and to some extent by Macklin, the Principle of "Public Opinion" has not been considered very vital even by the modern military theoreticians.

S. T. Das

It is very easy to fool the people at the start of a war and run it on a confidential basis. But later the wounded start coming back and the actual news spreads. Then, finally, when we have won, the men who fought the war come home. There will be millions of them who will come home knowing how things were. A government which wants to keep the confidence of its people after the war, or during the last stages of it, should take the people into its confidence and tell them everything that they can know, bad as well as good, so long as their knowing of it does not help the enemy. Covering up the errors to save the men who make them can only lead to a lack of confidence which can be one of the greatest dangers a nation can face.

Ernest Hemingway

Logistics

When the enemy assesses our forces, he values only those forces which the logistics community has ready for combat, or can get ready in time, and then sustain for a requisite period of time.

F. M. Rogers

My Dear General, this expanding and piling up of impedimentia [sic] has been so far almost our ruin, and will be our final ruin if it is not abandoned.

Letter, Abraham Lincoln to Gen Nathaniel P. Banks on the inability of the Union Army to move due to logistic excesses

Logistics controls all campaigns and limits many.

Dwight Eisenhower

The crews of a heavy bombardment group in China must ferry over their own gasoline, bombs, replacement parts and everything else in their own B-24s. Before this bombardment group can go on one combat flight, it must make four trips over the Hump. To perform one extremely dangerous mission, those crews must make four separate flights over the most hazardous terrain in the world.

"Hap" Arnold

Celerity

Attack the enemy suddenly when he is not prepared to resist. Celerity is the secret of success.

Dennis Hart Mahan

The policy of celerity . . . involves all elements of national power: military, political, economic, and psychological. . . . Celerity in the strictly military sense means swift, powerful, integrated actions directed at vulnerable and unexpected points of the enemy war-making establishment.

Dale O. Smith

Time

During the last great aerial raid on England, the German Air Force flew about 1,200 bombers over industrial targets which were critical to the survival of the British Empire. At the same time the Royal Air Force Fighter Command consisted of little more than a handful of trained pilots and fighter planes. The incredible German decision to stagger the attack, and to use twelve hours for its completion, actually multiplied the strength of the Royal Air Force Fighter Command by a factor of five. This was possible because on that day each Spitfire pilot had the time to fly five missions.

Nathan Twining

When you seem to be most prodigal of the soldier's blood, you spare it, by supporting your attacks well and by pushing them with the greatest vigor to prevent time from augmenting your losses.

Frederick the Great

Quick decisions are unsafe decisions.

Sophocles

The god of war hates those who hesitate.

Euripides

Take time to deliberate, but when the time for action arrives, stop thinking and go on.

Andrew Jackson

Three British Principles

Morale: Success in war depends more on morale than on physical qualities. Numbers, armament, resources or skill can not compensate for lack of courage, energy, determination and the bold offensive spirit which springs from a national determination to conquer.

Flexibility: Modern war demands a high degree of flexibility to enable pre-arranged plans to be altered to meet changing situations and unexpected developments. By strategical and tactical flexibility, force can be concentrated rapidly and economically at decisive places and times. This

entails good training, organization, discipline, and staff work, and above all, that rapidity of decision on the part of the commander which ensures that time is never lost.

Administration: The administrative arrangements must be designed to give the commanders the maximum freedom of action in carrying out the plan. Every administrative organization must be simple. Every operational commander must have a degree of control over the administrative plan within his sphere of command, corresponding to the scope of his responsibilities for the operational plan.

Quoted by Nathan Twining in
Neither Liberty nor Safety

Another Principle: Poise

Air Forces more than surface forces must consciously anticipate, posture, and ready their fighting forces to take advantage of fleeting opportunities. In the vernacular, they must be spring-loaded without being overcommitted to one anticipated course of events. In the fighter pilot vernacular, command elements must "lead-turn," or constantly stay ahead of, events; they must develop cues to guide increased surveillance and alert status; they must be mentally prepared to herd the enemy rather than simply react. The experience of war indicates that commanders must also economize alertness by aggressively relaxing their forces when opportunities for recovery and rest are achieved. Only

ruthless reduction of sensor and information data, to distinguish essentials from all the available information, can permit the mental clarity necessary for optimum poise and perception.

Suggested by the ideas of
Clausewitz, *On War*

Command

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Human Factors in War

All these attempts at theory are only to be considered in their analytical part as progress in the province of truth; but in their synthetical part, in their precepts and rules, they are quite unserviceable.

They strive after determinate quantities, whilst in War all is undetermined, and the calculation has always to be made with varying quantities.

They direct the attention only upon material forces, while the whole action is penetrated throughout by intelligent forces and their effects.

They only pay attention to activity on one side, whilst War is a constant state of reciprocal action, the effects of which are mutual. . . .

Every theory becomes infinitely more difficult from the moment it touches on the province of moral quantities.

Clausewitz

With equal or inferior power of destruction he will win who has the resolution to advance, who by his formations and maneuvers can continually threaten his adversary with a new phase of material action, who, in a word, has the moral ascendancy.

Ardant du Picq

Professional Growth

Every art has its rules and maxims. One must study them: theory facilitates practice. The lifetime of one man is not long enough to enable him to acquire perfect knowledge and experience. Theory helps to supplement it, it provides a youth with premature experience and makes him skillful through the mistakes of others.

Frederick the Great

In sum the leader has to achieve a balance between the essential need for professional competence in his own technical field and that broader understanding of human problems which can only be achieved from a wide and largely self-acquired education.

S. W. Roskill

If we wish to think clearly, we must cease imitating; if we wish to cease imitating, we must make use of our imagination. We must train ourselves for the unexpected in place of training others for the cut and dried. Audacity, and not caution, must be our watchword.

J. F. C. Fuller

The essential basis of the military life is the ordered application of force under an unlimited liability. It is the unlimited liability which sets the man who embraces this life somewhat apart. He will be (or should be) always a citizen. So long as h serves he will never be a civilian.

General Sir John W. Hackett

Training is light and lack of training is darkness. The problem fears the expert. A trained man is worth three untrained: that's too little—say six; six is too little—say ten to one. . . .

Alexander Suvorov

A great captain can be formed only by long experience *and* intense study; neither is his *own* experience enough—for whose life is there sufficiently fruitful of events to render his knowledge universal?

Archduke Charles of Austria

It is common to see men who have used all their limbs without once in their lives having utilized their minds. Thought, the faculty of combining ideas, is what distinguishes man from a beast of burden. A mule who has carried a pack for ten campaigns under Prince Eugene will be no better a tactician for it, and it must be confessed, to the disgrace of humanity, that many men grow old in an otherwise respectable profession without making any greater progress than this mule.

Frederick the Great

In the profession of war the rules of the art are never violated without drawing punishment from the enemy who is delighted to find us at fault. An officer can spare himself many mistakes by improving himself.

Frederick the Great

Education is a two-edged sword. If it indoctrinates with rigid principles, constantly hammering home the fixed and immutable nature of those principles, and if it offers neat solutions to every human problem in terms of these fixed principles, then change and development can not take place.

Dale O. Smith

The man who can't make a mistake can't make anything.

Abraham Lincoln

Today we maintain ourselves. Tomorrow, science will have moved forward yet one more step and there will be no appeal from the judgment which will then be pronounced on the uneducated.

Alfred North Whitehead

Perhaps the most valuable result of all education is the ability to make yourself do the thing you have to do, when it ought to be done, whether you like it or not.

T. H. Huxley

Few men during their lifetime come anywhere near exhausting the resources dwelling within them. There are deep wells of strength that are never used.

Adm Richard E. Byrd

In essence, courage is the ability to react positively to the challenge of the unknown. The unknown is in the main synonymous with the future, whose events are anticipated only in the light of experience, the sole heritage of the past. The future is the home of fear. It is not possible to fear the past.

J. M. Cameron

Command

We want *commanders*—not committees—to send our troops into battle.

W. G. Wyman

The first quality for a commander-in-chief is a cool head, which receives a correct impression of things. He should not allow himself to be confused by either good or bad news. The impressions which he receives successively or simultaneously in the course of a day should classify themselves in his mind in such a way as to occupy the places which they merit, for reason and judgment are the result of comparison of various impressions taken into just consideration.

Napoléon

The qualifications of the combat commander determine to a larger extent than any other single element the effectiveness of a unit in combat.

"Hap" Arnold

The first requirement to be a military leader is to know thoroughly one's specialty, and the second to be loyal to one's subordinates. Both conditions will save one from mutual disloyalty.

Simón Bolivar

Remember this: the truly great leader overcomes all difficulties, and campaigns and battles are nothing but a long series of difficulties to be overcome. The lack of equipment, the lack of food, the lack of this or that are only excuses; the real leader displays his quality in his triumphs over adversity, however great it may be.

George C. Marshall

I don't mind being called tough, because in this racket it's the tough guys who lead the survivors.

Curtis LeMay

LeMay approached leadership with three basic principles in mind. . . . He believed, first, that supervisors and associates must recognize the importance of each man's job or task, as well as of the man himself. Second, some progress, however small, must be made toward an established goal; otherwise serious dissatisfaction will develop. Lastly, commanders and supervisors must recognize and demonstrate real appreciation to those who have accomplished their assigned tasks.

Harry Borowski

The name of Trenchard spells out confidence in the RAF and we would not lose it by hearing him decried. We think of him as immense, not by what he says, for he is as near as can be inarticulate: his words barely enough to make men think they divine his drift: and not by what he writes, for he makes the least use of what must be the world's worst handwriting: but just by what he is. He knows; and

by virtue of this pole-star of knowledge he steers through all the ingenuity and cleverness and hesitations of the little men who help or hinder him. Trenchard invented the touchstone by which the Air Council try all their works. "Will this, or will this not, promote the conquest of the air?"

T. E. Lawrence, while enlisted as
Aircraftsman Ross

No normal young man is likely to recognize in himself the qualities that will persuade others to follow him. On the other hand, any man who can carry out orders in a cheerful spirit, complete his work step by step, use imagination in improving it, and then when the job is done, can face toward his next duty with anticipation, need have no reason to doubt his own capacity for leadership.

S. L. A. Marshall

The commander should practice kindness and severity, should appear friendly to the soldiers, speak to them on the march, visit them while they are cooking, ask them if they are well cared for, and alleviate their needs if they have any. Officers without experience in war should be treated kindly. Their good actions should be praised. Small requests should be granted and they should not be treated in an overbearing manner, but severity is maintained about everything regarding duty.

Frederick the Great

Advice

Never tell people how to do things. Tell them what to do and they will surprise you with their ingenuity.

George Patton

Every general-in-chief who undertakes to execute a plan that he knows to be bad is culpable. He should communicate his reasons, insist on a change of plan, and finally resign his commission rather than become the instrument of his army's ruin.

Napoléon

When things go wrong in your command, start searching for the reason in increasingly larger concentric circles around your own desk.

Gen Bruce C. Clarke

The principal task of the general is mental, involving large projects and major arrangements. But since the best dispositions become useless if they are not executed, it is essential that the general should be industrious in seeing whether his orders are executed or not.

Frederick the Great

Be as economical with your men's physical resources as you must be with your own, and guard both as carefully as material, munitions or fuel. Above all, practice in peace—on yourself and your men. *Industriousness* is too often equated, falsely, to *efficiency* in a peacetime force; yet if it becomes a habit it could be, in war, a self-inflicted wound.

Air Vice-Marshal John R. Walker

Morale makes up three quarters of the game, the relative balance of manpower accounts for only the remaining quarter.

Napoléon

The Commander and the Staff

Order or disorder depends on organization.
Sun Tzu

I had [the general] assemble his whole staff and tried to give them a picture of what we were up against in New Guinea. That was where the war was and it was not moving to Australia. Those youngsters up there were our customers and customers are always right. Our only excuse for living was to help them. We might work ourselves into having stomach ulcers or nervous breakdowns, but those things were not fatal. The work those kids in New Guinea and at Darwin were doing, however, had a high fatality rate. They deserved all they could get. Most of the crowd appreciated what I was talking about. The others would go home.
George Kenney

The final test of completed staffwork is this: If you yourself were the commander, would you be willing to sign the paper you have prepared? Would you stake your professional reputation on its being

right? If your answer would be "No," take the paper back and rework it, because it is not yet completed staffwork.

Anonymous monograph, quoted by
Robert D. Heinl, Jr.

The leader must know what he wants, think rapidly, and tell his subordinates clearly and simply what is desired. The leader should always seek the easy, correct way to perform a task. Very frequently this is not done. The bright subordinate quickly detects the inefficiency of his superior when he does things the hard way.

Maj Gen Charles H. Corlett

The staff is simply the servant of the general force; it exists but to further the welfare of the fighting establishment. Those within it are remiss if they fail to keep this rule uppermost.

S. L. A. Marshall

My Lord,

If I attempted to answer the mass of futile correspondence that surrounds me I should be debarred from all serious business of campaigning.

I must remind your Lordship—for the last time—that so long as I retain an independent position, I shall see to it that no officer under my command is debarred, by mere quill driving in your Lordship's office, from attending to his first duty, which is, and always has been, so to train the private men under his command that they may

without question, best any force opposed to them in the field.

I am, my Lord
Your obedient servant,
Wellington

Possibly apocryphal correspondence, supposedly written in 1810

In peacetime, absolute accountability is required because dollar economy in operations is a main object. This entails adherence to rigid forms, time-consuming, but still necessary.

S. L. A. Marshall

A bulky staff implies a division of responsibility, slowness of action and indecision, whereas a small staff implies activity and concentration of purpose.

William Tecumseh Sherman

When service at sea was constant and battle more and more rare, there was a natural inclination to devote more attention to seamanship than to warlike exercises. If there was time left over from seamanship drills (and attention to the outward display which is always likely, in a disciplined service during a period of stagnation, to be accepted as a mark of efficiency) it could be employed in gunnery drills devoted to maintaining a high rate of fire; they were impressive to behold and did not have the disadvantages of actual target practice, in which the powder consumed was likely

to make paint work dirty and had to be accounted for to a niggardly and hard-pressed government.

C. S. Forester explaining the decline of the Royal Navy, leading to their stunning tactical defeats in the War of 1812

Administration and Combat Support

When administration and orders are inconsistent, the men's spirits are low, and the officers exceedingly angry.

Chang Yu commenting on Sun Tzu

A battle sometimes decides everything, and sometimes the most trifling thing decides the fate of a battle.

Napoléon

I must have assistants who will solve their own problems and tell me later what they have done.

George C. Marshall

Nobody in the British Army ever reads a regulation or an order as if it were to be a guide for his conduct, or in any other manner than as an amusing novel; and the consequence is, that when complicated arrangements are to be carried into execution . . . every gentleman proceeds according to his fancy, and then when it is found that the [mission] fails (as it must fail if the order is not strictly obeyed) they come upon me to set matters right and thus my labor is increased tenfold.

Wellington

It is not recognized that the object of regulations and rules is to produce order in the fighting machine, and not to strangle the mind of the man who controls it.

J. F. C Fuller

Rules can certainly be burdensome and sometimes foolish; but if they are misbegotten they ought to be abolished completely rather than selectively waived. A wise rule should not be applied selectively either.

The Economist, 28 January 1989

There has been a constant struggle on the part of the military element to keep the end—fighting, or readiness to fight—superior to mere administrative considerations. The military man, having to do the fighting, considers that the chief necessity; the administrator equally naturally tends to think the smooth running of the machine the most admirable quality.

Alfred Thayer Mahan

Any commander who fails to exceed his authority is not of much use to his subordinates.

Arleigh Burke

Information Management

Unity of action develops from fullness of information. In combat, all ranks have to know what is being done, and why it is being done, if confusion is to be kept to a minimum. This holds true in all types of operation, whatever the Service. However, a surfeit of information clouds the mind and may sometimes depress the spirit.

S. L. A. Marshall

The central problem is not collecting and transmitting information, but synthesizing for the decision maker.

Richard Burt

There are no "battle management" magic bullets that will substitute for the ability of on-scene commanders, soldiers, and airmen to make appropriate decisions based on the ebb and flow of events.

Richard P. Hallion

To do our work we all have to read a mass of papers. Nearly all of them are far too long. This wastes time, while energy has to be spent in looking for vital points.

I ask my colleagues and their staffs to see to it that their reports are shorter.

The aim should be short reports which set out the main points in a series of short crisp paragraphs. . . .

Let us have an end of such phrases as these: "It is also of importance to bear in mind the following considerations . . . " or "Consideration should be given to the possibility of carrying into effect. . . ." Most of these woolly phrases are mere padding which can be left out altogether, or replaced by a single word.

Let us not shrink from using the short expressive phrase, even if it is conversational.

Reports drawn up on the lines I propose may at first seem rough as compared with the flat officialese jargon. But the saving in time will be great, while the discipline of setting out the real points concisely will prove an aid to clearer thinking.

Winston Churchill in 1940

The Operations Order

The current operations order used in Air Force and joint plans and operations predates the establishment of the Air Force. Curtis LeMay said the most important thing he learned at the Air Corps Tactical School was the operations order format. Known as the field order, the five paragraph field order, and the operations plan, this order has directed the actions of airmen in combat since World War II.

The principle virtue of the operations order is that it briefly states the missions of subordinate commands, while clearly stating the objectives of higher echelons.

For example, consider the operations order of an air division.

1. ***Situation.*** *Depicts the overall enemy situation and the objective of the numbered air force.*

2. ***Mission.*** *States the objective assigned to the issuing headquarters, in this case the air division.*

3. ***Execution.*** *Assigns subordinate objectives to each wing that will lead to accomplishing the air division's overall objective.*

4. ***Administration and Logistics*** *(also known as* ***Service Support****). Assigns necessary means for accomplishing the objective.*

5. ***Command and Signal.*** *Provides nonroutine communications instructions that subordinate echelons need for their missions.*

HEADQUARTERS
ALLIED AIR FORCES
APO. 929

September 8, 1942.

FIELD ORDER)

NO. 2)

MAPS: New Guinea Area.
Hudragraphic charts - Sea approaches New Guinea.

1. a. The enemy has concentrated large air, land and naval forces in the Rabaul-Faist Area. He has a small force at Milne Bay, which he supplies and probably reinforces nightly. He is attacking in considerable strength our troops in the Efogi area, with the apparent intention of a land approach to Moresby. He is slowly moving up to Bulolo Valley against our Kanga force on the left, as a diversion in support of his main effort at Efogi.

It is believed that the enemy may soon attempt to reinforce strongly Milne Bay force, as well as his ground forces in the Buna area. He is expected to reinforce heavily his air units at Lae, Salamaua and Buna between September 10th and 14th, with the objective of furnishing strong air support to the land forces operating against Moresby.

b. Our Air Forces in the Moresby area are being reinforced by two fighter squadrons and a Beaufighter Squadron at once. Nine B-17's and eight B-26's will be held at Moresby for a striking force.

2. This Air Force will attack and destroy enemy convoys approaching New Guinea, and will prevent, thru bombing and straffing raids on his airdromes, the effective employment of his air force by the enemy.

3. a. The Nineteenth Bombardment Group will maintain a force of nine B-17's at Moresby, and a striking force of all other available B-17's and crews at Mareeba. The force at Moresby, acting under the direct orders of this headquarters, will attack and destroy enemy convoys approaching New Guinea. The Commanding General, Rear Echelon, Townsville, will employ the striking force at Mareeba against suitable enemy convoy movements toward New Guinea, acting upon information received from reconnaissance aircraft and coast watchers.

b. The Twenty Second Bombardment Group will maintain a force of eight B-26's at Moresby, and a reserve of all other available aircraft and crews in the Townsville area. The force at Moresby, acting under the direct orders of this headquarters, will attack and destroy enemy shipping approaching the north coast of New Guinea, and will be employed also against enemy airdromes in New Guinea. The reserve in the Townsville area will be on call to this headquarters on one hours notice effective 0000Z September 10th.

c. The Third Bombardment Group will maintain a force of twenty five A-20's in the 89th Squadron (Reinforced) at Moresby. It will maintain a reserve of all available A-20's and B-25's in the Townsville area on call to this headquarters on one hours notice effective 0000Z September

10th. The force at Moresby will attack enemy airdromes on orders from this headquarters, destroying enemy aircraft, materiel and personnel with machine gun fire and parachute bombs.

d. The Fighter Command (Provisional) will protect local airdromes and vital installations from ground and air alert status. It will be prepared to escort light and medium bombardment on missions within the range of its equipment. It will assist bombardment in its mission of destroying enemy aircraft on the ground when lack of enemy air strength permits ground staffing. It will maintain a reserve of twelve P-40's and crews at Moresby, a reserve of all available P-30 aircraft and crews in the Townsville area, and a reserve of ten P-400's and crews in the Townsville area, all on call to this headquarters on one hours notice. Escort of fighter replacements to Moresby will be performed by B-25 aircraft of the 3rd Bomb. Group.

e. The Ninth Operational Group (RAAF), less all but one flight of the 30th Squadron, is charged with the local defense of Milne Bay, operating against enemy convoys approaching Milne Bay within the effective range of its equipment, and preventing effective enemy air attacks on airdromes and vital installations.

The 30th Squadron, less one flight, will attack and destroy enemy aircraft on New Guinea airdromes with cannon and machine gun fire on orders from this headquarters.

No. 6 Squadron of the Ninth Operational Group will maintain a reconnaissance during daylight hours of the seaward approaches to Milne Bay, as well as daily surveillance of the D'entre Casteau Islands and the Louisiade archipelago. Detailed and specific coverages will be assigned daily by this headquarters.

f. The 435th Reconnaissance Squadron will maintain a close search of the sea approaches to New Guinea from Rabaul, Faisi and Truk. Specific coverages will be assigned daily by this headquarters.

g. The 8th Photo Squadron will maintain a close surveillance during daylight hours of the North Coast of New Guinea from Finschhafen to Tufi peninsula, reporting any enemy shipping immediately, particularly enemy air concentrations on airdromes at Lae, Salamaua and Buna.

4. No change.

5. See daily Annex to Operations Orders.

By command of Brigadier General WHITEHEAD:

F. H. SMITH Jr.,
Colonel, Air Corps,
Chief of Staff.

OFFICIAL:

WILLIAM G. HIPPS,
Major, Air Corps,
AC of S, G-3.

Command Arrangements

It is astonishing how obstinate allies are, how parochially minded, how ridiculously sensitive to prestige and how wrapped up in obsolete political ideas. It is equally astonishing how they fail to see how broad-minded you are, how clear your picture is, how up to date you are and how co-operative and big-hearted you are. It is extraordinary.

Field Marshal Sir William Slim

The proverbial weakness of alliances is due to inferior power of concentration.

Alfred Thayer Mahan

This is notably less of a limitation for combined air forces, which can be concentrated in space and time, can provide simultaneous supporting efforts if differently equipped, can mutually support one another in many ways, and can concentrate over time on particular target systems, objectives, and campaigns.

Of all the lessons we learned about tactical air operations, perhaps the most important is that the air commander, his group and squadron commanders must have a sincere desire to become part of the ground team. The Army must, of course, have the same dedication to reciprocate.

This close liaison can come only from close day-to-day contact—especially at command levels; there must be almost instantaneous communication between ground and air and through all the chain of command.

Lt Gen Elwood R. ("Pete") Quesada

At the start of World War II, service cooperation and even task force cooperation was often creaky, inadequate, downright bad. In rear areas and in overall concepts and policies and above all in results, service rivalries and obsolete or selfish and arbitrary restrictions marred the war effort in the opening months.

Hanson Baldwin

The greatest lesson of this war has been the extent to which air, land, and sea operations can and must be coordinated by joint planning and unified command. The attainment of better coordination and balance than now exists between services is an essential of national security.

"Hap" Arnold

It [a joint committee] leads to weak and faltering decisions—or rather indecisions. Why, you may take the most gallant sailor, the most intrepid airman, or the most audacious soldier, put them at a table together—what do you get? *The sum of their fears.*

Attributed to Winston Churchill

It turned out to be another scrambled outfit . . . with so many lines of responsibility, control, and coordination on the chart that it resembled a can of worms as you looked at it. I made a note to tell Walker to take charge, tear up the chart, and have no one issue orders around there except himself. After he got things operating simply, quickly, and efficiently he could draw up a new chart if he wanted to.

George Kenney

Mutual support is the fundamental basis upon which the air-surface relationship is founded.

Air Force Manual 1-3, 1953

FM 100-20

FIELD SERVICE REGULATIONS

COMMAND AND EMPLOYMENT OF AIR POWER

SECTION I

DOCTRINE OF COMMAND AND EMPLOYMENT

1. RELATIONSHIP OF FORCES.—LAND POWER AND AIR POWER ARE CO-EQUAL AND INTERDEPENDENT FORCES; NEITHER IS AN AUXILIARY OF THE OTHER.

2. DOCTRINE OF EMPLOYMENT.—THE GAINING OF AIR SUPERIORITY IS THE FIRST REQUIREMENT FOR THE SUCCESS OF ANY MAJOR LAND OPERATION. AIR FORCES MAY BE PROPERLY AND PROFITABLY EMPLOYED AGAINST ENEMY SEA POWER, LAND POWER, AND AIR POWER. HOWEVER, LAND FORCES OPERATING WITHOUT AIR SUPERIORITY MUST TAKE SUCH EXTENSIVE SECURITY MEASURES AGAINST HOSTILE AIR ATTACK THAT THEIR MOBILITY AND ABILITY TO DEFEAT THE ENEMY LAND FORCES ARE GREATLY REDUCED. THEREFORE, AIR FORCES MUST BE EMPLOYED PRIMARILY AGAINST THE ENEMY'S AIR FORCES UNTIL AIR SUPERIORITY IS OBTAINED. IN THIS WAY ONLY CAN DESTRUCTIVE AND DEMORALIZING AIR ATTACKS AGAINST LAND FORCES BE MINIMIZED AND THE INHERENT MOBILITY OF MODERN LAND AND AIR FORCES BE EXPLOITED TO THE FULLEST.

3. COMMAND OF AIR POWER.—THE INHERENT FLEXIBILITY OF AIR POWER, IS ITS GREATEST ASSET. THIS FLEXIBILITY MAKES IT POSSIBLE TO EMPLOY THE WHOLE WEIGHT OF THE AVAILABLE AIR POWER AGAINST SELECTED AREAS IN TURN. SUCH CONCENTRATED USE OF THE AIR STRIKING FORCE IS A BATTLE WINNING FACTOR OF THE FIRST IMPORTANCE. CONTROL OF AVAILABLE AIR POWER MUST BE CENTRALIZED AND COMMAND MUST BE EXERCISED THROUGH THE AIR FORCE COMMANDER IF THIS INHERENT FLEXIBILITY AND ABILITY TO DELIVER A DECISIVE BLOW ARE TO BE FULLY EXPLOITED. THEREFORE, THE COMMAND OF AIR AND GROUND FORCES IN A THEATER OF OPERATIONS WILL BE VESTED IN THE SUPERIOR COMMANDER CHARGED WITH THE ACTUAL CONDUCT OF OPERATIONS IN THE THEATER, WHO WILL EXERCISE COMMAND OF AIR FORCES THROUGH THE AIR FORCE COMMANDER AND COMMAND OF GROUND FORCES THROUGH THE GROUND FORCE COMMANDER. THE SUPERIOR COMMANDER WILL NOT ATTACH ARMY AIR FORCES TO UNITS OF THE GROUND FORCES UNDER HIS COMMAND EXCEPT WHEN SUCH GROUND FORCE UNITS ARE OPERATING INDEPENDENTLY OR ARE ISOLATED BY DISTANCE OR LACK OF COMMUNICATION.

JULY 1943

Doctrine

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Basics

Those who are possessed of a definitive body of doctrine and of deeply rooted convictions upon it will be in a much better position to deal with the shifts and surprises of daily affairs than those who are merely taking short views, and indulging their natural impulses as they are evoked by what they read from day to day.

Winston Churchill

The organization of men and machines into military forces does not necessarily mean that they are equipped and trained for the accomplishment, if necessary, of decisive action in war. For this, the discipline of a coherent body of thought appears to be indispensable.

Eugene Emme

In short, doctrine is what is officially approved to be taught. But it is far more than just that. Doctrine is the departure for virtually every activity in the air arm.

I. B. Holley, Jr.

One might say that doctrine is the school of thought on war which is in vogue at any one time.

Dale O. Smith

The standardization of technique of operations is not possible in this global war, for 90 times out of 100 an idea that succeeds in Italy will not work in New Guinea. Hence we must be versatile—our tactics must be susceptible to change—our commanding officers must have ingenuity and imagination.

"Hap" Arnold

Doctrine is like a compass bearing; it gives us the general direction of our course. We may deviate from that course on occasion, but the heading provides a common purpose to all who travel along the way. This puts a grave burden on those who formulate doctrine, for a small error, even a minute deviation, in our compass bearing upon setting out, may place us many miles away from the target at the end of the flight. If those who distill doctrine from experience or devise it from logical inference in the abstract fail to exercise the utmost rigor in their thinking, the whole service suffers.

I. B. Holley, Jr.

The traditions among all the armed services are much older than any government, more conservative than any department of government, and more sure to build on a foundation that they are certain of, rather than to take any chance of making a mistake.

Billy Mitchell

There are tens of thousands of individuals in the Air Force whose training and traditions lead them to identify with one or another of the major commands, with SAC or TAC, or MAC. And each of these bespeaks a vested interest. Each such interest must be placated, reconciled, accommodated. These necessities, along with the never-ending confrontations with other services fighting for roles and missions, keep the present-day guardians of Air Force doctrine eternally on the run. They are so busy putting out fires, few of them find time in which to think at leisure.

I. B. Holley, Jr.

Understanding requires theory; theory requires abstraction; and abstraction requires the simplification and ordering of reality. . . . Obviously, the real world is one of blends, irrationalities, and incongruities: actual personalities, institutions, and beliefs do not fit into neat logical categories. Yet neat logical categories are necessary if man is to think profitably about the real world in which he lives and to derive from its lessons for broader application and use.

Samuel P. Huntington

Terminology

The clarity and therefore the utility of doctrine is a direct product of how well language is used in its writing.

How many a dispute could have been deflated into a single paragraph if the disputants had just dared to define their terms.

Aristotle

The beginning of wisdom is calling things by their right names.

Confucius

On July 26, 1945, the Potsdam Declaration urged Japan to surrender. Thereupon the Japanese Cabinet agreed that it was time to make peace, and on July 28 Premier Suzuki announced a policy of "mokosatsu." This unfortunate word has no exact counterpart in English. Its approximate meaning is "to withhold comment," but it also means "to ignore." The Domei News Agency at once broadcast in English that the Cabinet had decided to ignore the Potsdam ultimatum. After the atomic bombs had been dropped, President Truman cited the Japanese rejection of the ultimatum as a reason. Convincing evidence available since then

shows that the Premier had indeed meant to convey "no comment," with the implication that a significant announcement would come later. Connoisseurs of the ifs of history say that the right translation could have brought quick peace without atomic explosions.

Peter T. White

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best copy available

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Eisenhower, Dwight David, General of the Army. Thirty-fourth President of the United States; supreme commander of Allied forces in Europe in World War II.

Eliot, George Fielding. American military commentator; author of *Bombs Bursting in Air* (1938) and *Hate, Hope, and High Explosives* (1948).

Emme, Eugene M. NASA historian; author of *The History of Space Flight* (1965); editor of the classic *The Impact of Air Power* (1959).

Euripides. Athenian playwright and contemporary of Thucydides.

Foch, Ferdinand, Marshal of France. Commander of the Allied offensive that ended World War I; author of *The Principles of War* (1903).

Forester, C. S. British novelist and naval historian.

Franklin, Benjamin. American revolutionary statesman, scientist, and writer.

Frontinus (Sextus Julius Frontinus). Twice consul of Rome; governor of Britain in the first-century A.D.; author of *Stratagematicon* ("on war").

Frederick II ("the Great"), King of Prussia. Brilliant military leader and domestic reformer; rebelled against military discipline as a youth and was court-martialed; in the Seven Years' War of 1756–1763, he held off the armies of Russia, France, and Austria (all larger powers) through adroit maneuvering, timing, and skill.

Fuller, John Frederick Charles, Major General, British Army. Leading twentieth-century military theorist; historian; advocate of mobile warfare; proponent of the principles of war as we know them today; author of *Foundations of the Science of War* (1923).

Galland, Adolf, Lieutenant General, German Air Force. Inspector general of fighter aviation and commander of the first jet fighter squadron in World War II; author of *The First and the Last* (1954).

Geiger, Keith W., Colonel, USAF. Editor of *Airpower Journal.*

Genda, Minoru, Lieutenant General, Japanese Air Self-Defense Force. Air operations officer and planner for the attack on Pearl Harbor; leader in the formation of the postwar Japanese Air Self-Defense Force.

Goodson, Wilfred L., Brigadier General, USAF. Fighter pilot (128 missions in Southeast Asia); astrophysicist; operations research theorist; assistant chief of staff for studies and analysis; commander of the Air Force Center for Studies and Analysis.

Griffith, Samuel B., II, Brigadier General, USMC. Translator of Sun Tzu (1963) and Mao Tse-tung (1961); author of *The Battle for Guadalcanal* (1963).

Groves, Percy Robert Clifford, Brigadier General, British Army. Air Minister for Britain in World War I; early air prophet; author of *Our Future in the Air* (1935) and *Behind the Smoke Screen* (1934).

Hackett, Sir John Winthrop, General, British Army. World War II leader of elite units; brigade commander during the airborne assault of Holland; author of *The Profession of Arms* (1986).

Hale, James O., and **Barry D. Watts.** Authors of "Doctrine: Mere Words, or a Key to War-Fighting Competence?" in *Air University Review*, September–October 1984.

Hall, Norris F. Harvard professor of chemistry; prophesized both fusion and fission weapons in his 1925 lecture "Science in War."

Hallion, Richard. Aviation historian; author of several books, including *Test Pilots* (1981), *Rise of the Fighter Aircraft* (1984), and *The Naval Air War in Korea* (1984).

Hamilton, Alexander. Statesman and leading Federalist; captain of artillery and aide to General Washington; distinguished for bravery at Yorktown; first US secretary of the treasury.

Heinl, Robert D., Jr. US Marine Corps officer; compiler of *Dictionary of Military and Naval Quotations* (1966).

Hemingway, Ernest. American journalist, novelist, and short story writer; author of *A Farewell to Arms* (1929) and *Men at War* (1942).

Ho Chi Minh. Twentieth-century Vietnamese revolutionary theorist and leader.

Holley, I. B., Jr., Major General, USAF. Eminent historian of ideas; author of the classic *Ideas and Weapons* (1953).

Howard, Michael. British military theorist; author of *The Causes of Wars and Other Essays* (1984) and *Clausewitz* (1983).

Hughes, Daniel J. Command historian of the US Army Combined Arms Center at Fort Leavenworth.

Huntington, Samuel P. Author of *The Soldier and the State* (1956), the first major look at the US military as a profession.

Huxley, Thomas Henry. British biologist; foremost exponent of Darwinian thinking in the Victorian era.

Iino, Matsuichi. Japanese Army officer in World War II; interviewed in *Reports of General MacArthur*.

Jackson, Andrew. Seventh President of the United States; victor of several battles in the War of 1812.

Jackson, Robert. Military surgeon and founder of the modern study of human factors in war; author of *A Systematic View of the Formation, Discipline, and Economy of Armies* (1804).

Johnson, James Edgar ("Johnnie"), Air Vice-Marshal, RAF. World War II ace; historian of air combat; author of *Wing Leader* (1956) and *Full Circle* (1968).

Jomini, Antoine Henri, General of Brigade of France and Lieutenant General of Russia. Served as Marshal Ney's

chief of staff; director of the French general staff's historical section in the Napoleonic Wars; author of *The Art of War* (1855).

Jones, Steven B. Political geographer, professor of geography; author of "Global Strategic Views" in *The Impact of Air Power*, ed. Eugene M. Emme.

Jordan, David Starr. California activist, essayist, and politician; author of *War & Waste: A Series of Discussions of War and War Accessories* (1913).

Kenney, George Churchill, General, USAF. World War I fighter pilot with two victories; commander of Southwest Pacific Area Air Forces and Far Eastern Air Forces in World War II; author of *General Kenney Reports* (1949) and three biographies.

Koller, Karl, General, German Air Force. Last chief of staff of the German Air Force in World War II.

Lawrence, Thomas Edward, Colonel, British Army, Aircraftsman, Royal Air Force. Leader of the Arab revolt against the Ottoman Turkish empire in World War I; linguist, scholar, archaeologist, and writer.

Lay, Beirne, Jr., Colonel, USAF. Eighth Air Force staff officer in World War II; author and screenwriter of *Twelve O'Clock High* (1948).

LeMay, Curtis Emerson, General, USAF. Commander of 3d Bomb Division in Europe and chief of staff of the Strategic Air Forces in the Pacific in World War II; commander of USAFE during the Berlin airlift; modernizer of the Strategic Air Command; chief of staff from 1961 to 1965.

Lenin (formerly Ulyanov), Vladimir Ilyich. Russian revolutionary leader and theorist.

Liddell Hart, Sir Basil Henry, Captain, British Army. Military theorist and historian; advocate of combined arms warfare and the indirect approach; author of numerous books, including *Paris, or the Future of War* (1925) and *Strategy* (1954).

Lincoln, Abraham. Sixteenth President of the United States.

Luvaas, Jay. Distinguished military historian; author of *Frederick the Great on the Art of War* (1966) and *The Education of an Army* (1954).

MacArthur, Douglas, General of the Army. Division commander in World War I; chief of staff from 1931 to 1935; commander of Allied forces in the Southwest Pacific in World War II; commander of United Nations forces in Korea until relieved by President Truman.

MacIsaac, David, Lieutenant Colonel, USAF. Eminent air power historian; author of *Strategic Bombing in World War II* (1976); editor of *The United States Strategic Bombing Survey: Selected Reports in Ten Volumes* (1976).

Mahan, Alfred Thayer, Admiral, USN. Son of Dennis Hart Mahan; naval historian and theorist; author of *The Influence of Sea Power upon History* (1890), one of the most influential volumes of historical analysis ever written.

Mahan, Dennis Hart. Professor of military art and science at West Point; founder of professional military study in the United States; influenced many Civil War generals.

Mao Tse-tung. Twentieth-century Chinese revolutionary theorist and leader.

Marshall, George Catlett, General of the Army. Chief of staff from 1939 to 1945; chief strategist and organizer of military operations and logistics in World War II; awarded the Nobel Prize for his contributions to the postwar recovery of Europe.

Marshall, Samuel Lyman Atwood, Brigadier General, USA. Military historian and analyst; advocated interviewing large numbers of soldiers immediately after battle; author of *Blitzkrieg* (1940), the controversial *Men Against Fire* (1947), and many other books.

Maugham, William Somerset. British short story writer; adventurer; intelligence operative in World War I.

Meyer, John C., General, USAF. World War II ace with 24 victories; Korean War wing commander with two victories; commander in chief of the Strategic Air Command.

Mitchell, William ("Billy"), Major General, US Army Air Service. Outspoken advocate of air power; chief of air services for the US Group of Armies in World War I; author of *Our Air Force* (1921), *Winged Defense* (1925), and *Skyways* (1930).

Moltke, Helmuth von ("The Elder"), Field Marshal of Germany. Twentieth-century strategist and military reformer whose military successes led to German unification; linguist and novelist.

Montgomery, Viscount Bernard Law, Field Marshal, British Army. Commander of the British Eighth Army in

North Africa; commander of Allied land forces at Normandy.

Murray, Williamson, Professor of History, Ohio State University. Author of *Strategy for Defeat: The Luftwaffe 1939–1945* (1983).

Napier, Sir Charles James, General, British Army. Military leader in the Napoleonic Wars and in India.

Napier, Sir William. Military leader in the Napoleonic Wars; military historian; younger brother of Sir Charles Napier.

Napoléon Bonaparte, Emperor of France. Military leader; multiskilled reorganizer of continental European politics and law.

Olds, Robin, Brigadier General, USAF. World War II ace with 13 victories; wing commander in Southeast Asia with four victories.

O'Malley, Jerome F., General, USAF. Pilot of the first operational SR-71 mission; wing commander of reconnaissance wings in Southeast Asia; commander of Tactical Air Command at the time of his death in 1985.

Oman, Sir Charles William Chadwick. The dean of early twentieth-century military historians; author of *On the Writing of History* (undated).

Ovid (Publius Ovidius Naso). Roman author and contemporary of Augustus Caesar.

Pace, Dave ("Preacher"), Lieutenant, USN. Instructor, Navy Fighter Weapons School.

Paine, Thomas. American revolutionary writer; author of *Common Sense* (1776), *Crisis* (1777), and *The Rights of Man* (1792).

Pasteur, Louis. Nineteenth-century chemist; "father of bacteriology."

Patton, George Smith, Jr., General, US Army. Commander of armored forces in World War I; commander of large ground forces, including Third Army, in World War II; prolific author of articles in military professional magazines.

Petrarch (Francesco Petrarca). Italian scholar and author; the first great figure of the Renaissance.

Posen, Barry P. Author of *The Sources of Military Doctrine* (1984).

Possony, Stefan T. Political scientist and early consultant to the US Air Force; author of *Tomorrow's War* (1938), *Strategic Air Power* (1949), and *A Century of Conflict* (1953).

Power, Thomas S., General, USAF. Commander of bomber forces in World War II; commander in chief of SAC from 1957 to 1964; author of *Design for Survival* (1964).

Quesada, Elwood Richard ("Pete"), Lieutenant General, USAF. Pioneer aviator; commander of fighter forces in North Africa and Europe in World War II; first commander of Tactical Air Command; first administrator of NASA.

Radford, Arthur W., Admiral, USN. Carrier aviator; World War II commander of Carrier Division 6 at Iwo Jima and

Okinawa; major figure in the "Admiral's Revolt"; chairman of the Joint Chiefs of Staff from 1953 to 1957.

Raleigh, Sir Walter Alexander. Scholar and writer; prepared *The War in the Air 1914–1918* (7 vols., 1922–1937), the official history of the RAF in World War I.

Ransom, Harry Howe. Military researcher and writer; author of numerous works, including *Central Intelligence and National Security* (1958).

Richthofen, Manfred von, Rittmeister, German Air Force. Germany's leading ace in World War I with 80 victories.

Rickenbacker, Edward Vernon, Captain, US Army Air Service. America's leading ace in World War I with 24 victories; author of several books, including *Rickenbacker* (1967).

Ridgway, Matthew B., General, USA. Commander of the 82d Airborne Division and XVIII Airborne Corps in World War II; commander of United Nations Command in the Korean War; chief of staff from 1953 to 1955; author of *Soldier* (1956) and *The Korean War* (1967).

Robertson, Sir William, Field Marshal, British Army. Chief of the Imperial General Staff in World War I; author of *From Private to Field Marshal* (1921).

Rogers, Felix M., General, USAF. Ace with 12 victories in World War II; commander of Air Force Logistics Command.

Rommel, Erwin, Field Marshal, German Army. Leader of German armored forces in the Battle of France and the

North African campaigns; organizer of invasion defense forces in World War II.

Roskill, Stephen W., Captain, British Royal Navy. Commander in the Pacific in World War II; author of the Royal Navy's official history of World War II, *The War at Sea* (1961).

Saxe, Hermann Maurice de, Marshal of France. Commissioned at age 12, a regimental commander of cavalry at 17; leading military commander of the early eighteenth century; author of *My Reveries* (1732).

Schriever, Bernard Adolph, General, USAF. World War II bomber pilot; proponent of the ICBM program; commander of Air Force Systems Command from 1959 to 1966.

Shaw, Robert L., Lieutenant Colonel, USAFR. Fighter pilot; author of *Fighter Combat: Tactics and Maneuvering* (1985).

Sherman, William Tecumseh, General, Army of the United States. Union general in the Civil War; early in the war, press correspondents labeled him insane; at his request, retired in 1874 so Sheridan could succeed him as the army's commanding general.

Shinohara, Masaru. Japanese Army officer in World War II; interviewed in *Reports of General MacArthur*.

Sigaud, Louis A. US Army intelligence officer; author of *Douhet and Aerial Warfare* (1941).

Slessor, Sir John Cotesworth, Air Marshal, RAF. World War I pilot; architect of British air strategy in World War

II; author of several books, including *Air Power and Armies* (1936) and *The Central Blue* (1957).

Slim, Sir William Joseph, Field Marshal, British Army. Served on three fronts in World War I; Allied commander in Burma during World War II; author of the classic *Defeat into Victory* (1956).

Smith, Dale O., Major General, USAF. Squadron and group commander in World War II; military theorist; author of *U.S. Military Doctrine: A Study and Appraisal* (1955).

Smith, Walter Bedell. Strategic planner and chief of staff to General Eisenhower in World War II.

Snow, Donald M. Political scientist and writer; author of *The Nuclear Future* (1983) and *National Security* (1987).

Sophocles. Athenian playwright; contemporary of Thucydides.

Spaatz, Carl A. ("Tooey"), General, USAF. First chief of staff of the US Air Force, 1947 to 1948; World War I fighter pilot with three victories; early air pioneer; commanded the *Question Mark* endurance flight and air refueling demonstration; commander of major air force elements in every overseas theater in World War II.

Spruance, Raymond Ames, Admiral, USN. Task force commander at the Battle of Midway; commander of large naval forces in the Pacific in World War II.

"Squadron Leader." Pseudonym of the author of *Basic Principles of Air Warfare: The Influence of Air Power on Sea and Land Strategy* (1927); this volume and Slessor's *Air Power and Armies* typify the "conservative" or

"flexible" school of air power theory, which contrasts with the exclusive prescriptions of Douhet and his adherents.

Steuben, Baron Friedrich Wilhelm Augustin von. Inspector general of the Continental Army in the Revolutionary War; author of the first tactics manual for United States forces.

Sun Tzu. Writer of the short classic *The Art of War*; probably a contemporary of Alexander the Great.

Suvorov, Alexander, Marshal of Russia. Eighteenth-century commander and tactical innovator; nobleman who enlisted for eight years to gain experience; student of the black Russian general Hannibal; author of *The Science of Conquering*.

Tedder, Arthur William, Air Marshal, RAF. Deputy supreme commander of Allied forces in Europe in World War II; author of *Air Power in War* (1948) and *With Prejudice* (1966).

Thoreau, Henry David. Nineteenth-century American idealist and essayist.

Thucydides. Commander of land and sea forces in the early period of the Peloponnesian Wars; author of *The Peloponnesian Wars*, probably the most illustrative book ever on the problems of strategy and policy.

Trenchard, Hugh Montague, British Air Marshal, Viscount. Commander of the Royal Flying Corps in the field in World War I; chief of Air Staff from 1919 to 1929; single-minded advocate of air progress.

Twining, Nathan Farragut, General, USAF. Commander of major air force units in the Pacific and Europe in World

War II; chief of staff from 1953 to 1957; chairman of the Joint Chiefs of Staff from 1957 to 1961; author of *Neither Liberty nor Safety* (1966).

Vandenberg, Hoyt S., General, USAF. Commander of Ninth Air Force in World War II; chief of staff from 1948 to 1953.

Vauthier, Arsene Maria Paul. Author of *La Doctrine de Duerre du Général Douhet* (1935) and *La Défense Antiaérriene des Grandes Unités* (1936); both of these books were accessible to the many Air Corps officers who spoke French long before any English translation of Douhet was widely available.

Walker, John R., Air Vice-Marshal, RAF. Prolific author of modern commentaries on air power, including *Air-to-Ground Operations* (1987).

Warden, John A., III, Colonel, USAF. Fighter pilot; forward air controller in Southeast Asia; author of *The Air Campaign* (1988).

Washington, George, General of the Armies of the United States. First President of the United States.

Watts, Barry D., Lieutenant Colonel, USAF. Fighter pilot and doctrine analyst; advocate of studying the frictions inherent to war; author of *The Foundations of U.S. Air Doctrine: The Problem of Friction in War* (1984).

Welch, Larry. Chief of staff, US Air Force.

Wellington, Arthur Wellesley, First Duke of Wellington. Leading British general; defeated forces of Napoléon in the Peninsular Campaign and at Waterloo.

Wells, Herbert George. Futurist; author of *The War in the Air* (1908).

White, Peter T. Journalist and linguist; served in US Army intelligence in World War II.

Whitehead, Alfred North. Twentieth-century British mathematician and philosopher.

Wyman, Willard Gordon, General, USA. Officer in World War II and Korea; commander of 71st Infantry Division, IX Corps, Allied land forces for Southeast Europe, Sixth Army, and Continental Army Command.

Yeager, Charles Elwood ("Chuck"), Brigadier General, USAF. World War II ace with 13 victories, including five on one mission and a victory over a jet; test pilot; first man to fly supersonic.

Yokoi, Toshiyuki, Vice Admiral, Imperial Japanese Navy. Aircraft carrier commander and air fleet commander in World War II; historian.

Zhigarev, Pavel F., Chief Marshal of Aviation, Soviet Union. Commander in chief of Soviet air forces from 1941 to 1942 and 1949 to 1957; later, head of Aeroflot.

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Lt Gen Truman Spangrud put the fuel into this project. Dr David MacIsaac—with the assistance of Lt Cols Jeff Benton, Price Bingham, Rick Clark, Rick Davis, and Frank Donnini, and Maj Tom Blow—did the preflight. The staff of the Air University Library, and in particular Melrose Bryant, hooked up the power cart. Lt Col Charles Westenhoff cranked the engines. The Air University Press staff ran the checks and pulled the chocks. Col Dennis M. Drew was the marshaler and Col Sidney J. Wise called for clearance.

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